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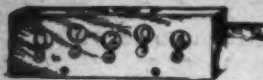
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THE IRON AGE

THURSDAY, JANUARY 30, 1902.

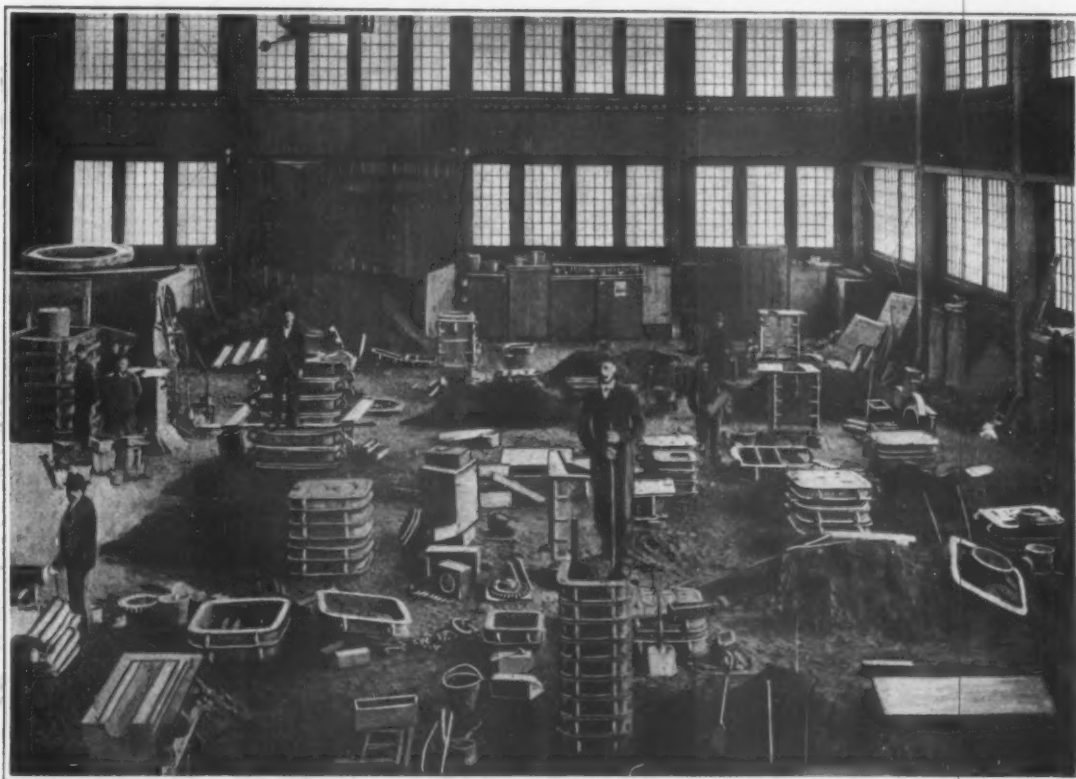
To Enlarge Shipbuilding Plant.

The shipbuilding company of Townsend & Downey, now engaged in constructing the yacht "Meteor" for the use of the German Emperor, have decided to enlarge their plant at Shooter's Island so as to enable them to bid for the construction of any vessel—yacht, battle ship or transatlantic liner. Under the title of the Townsend-Downey Shipbuilding Company the firm have been incorporated, with a capital of \$3,500,000. The directors are John H. Cuthbert and James Alden of New York City, W. B. Smith of Montclair, N. J.; B. F. Warren of Brooklyn, and M. P. Williams of Westfield, N. J.

It was announced recently that the company had

New Steel Foundry of the Pennsylvania Steel Company.

The Pennsylvania Steel Company recently completed a new steel foundry at their plant at Steelton, Pa. This company have long been manufacturers of steel castings, both for their own use and for general sale. A large part of their product has always been used for their street railway work, but the demand from outside customers has so increased that they have recently found it necessary to install the new plant, which is illustrated herewith. Heretofore the care of their own work has been their chief concern, but the new foundry, with its largely in-



Portion of Molding Floor.

NEW STEEL FOUNDRY OF THE PENNSYLVANIA STEEL COMPANY.

planned to increase their holdings on Shooter's Island from 13 to 42 acres, and that the capacity of the shipbuilding plant would be more than trebled. The company have now a marine railway capable of taking a vessel 375 feet in length. The capacity of this, it was said, will probably be increased. Since the company began building boats, in 1900, several notable craft have been constructed by them, including the schooner yachts "Elmina" and "Muriel," the "Thistle," the College Point Ferry Company's new ferry boat "North Beach," the Government boat "Sabine" and the "Bache" for the United States coast survey service. The company are now rebuilding the steamship "Saale," which was nearly destroyed by fire during the Hoboken conflagration.

It will be recalled that when the last lot of naval vessels were purchased by the Government, this company were among the bidders.

The United States Tube Company of Buffalo, N. Y., have issued their first price-list, covering charcoal, iron and steel boiler tubes, which they manufacture.

creased capacity, will enable them to become an important factor in the steel casting trade.

The Steelton plant is situated on the banks of the Susquehanna River, about $3\frac{1}{2}$ miles below Harrisburg, Pa., and is on the lines of both the Pennsylvania Railroad and the Philadelphia & Reading Railway, thus giving unexcelled railroad facilities.

The foundry proper occupies a space 756 feet long by 134 feet wide with a lean to 40 feet wide, in the rear of the line of furnaces. The building is of modern steel frame construction, covered with corrugated iron. Ample window space has been provided and the interior of the roof has been finished in white, so that even on very dark days the light on the molding floor, Fig. 1, is good. In addition a system of arc lights is located in the roof, to thoroughly illuminate all portions of the interior. This idea of giving all the light possible on the molding floor of a foundry is receiving more and more attention from designers of such buildings, and the Pennsylvania Steel Company's engineers took this fully into consideration when laying out their plant. The re-

sult is very apparent to even a casual observer. The building is divided into two bays of 67 feet each, and in each bay there are three traveling cranes, furnished by the Morgan Engineering Company. In the bay over the furnaces there are two traveling cranes of 50 tons capacity with a 25-ton auxiliary hoist and one of 25 tons capacity with a 15-ton auxiliary hoist, the large cranes having a clear lift of 40 feet. In the bay over the molding floors there are three 20-ton traveling cranes, each having a 10-ton auxiliary hoist and 25-foot lift. In addition to the traveling cranes the foundry is equipped with air hoists mounted on pillars and also with wall jib cranes for light molding, assembling and putting together the molds and for handling castings.

In the furnace side of the plant one narrow gauge track is so arranged that raw material can be run up to the charging floor of the furnace. There are also two tracks arranged so that ingots can be cast on trucks, in case it is found desirable to make ingots for the roll-

side by side, or one line of cars to be used on the center tracks when very large molds are to be dried.

The plant will have three 20-ton open hearth furnaces and one 10-ton furnace, as shown in Figs. 3 and 4. The furnaces are the Campbell tilting type, and all the mechanism connected with them is operated by electric motors, the current being supplied from the steel company's central power station. Each furnace can make three to four heats per day, and with the two furnaces already in operation the capacity is easily 100 tons of cast steel per day; when the four furnaces are in operation it is expected to turn out 250 tons per day. Castings of all sizes and weights up to 60,000 pounds can easily be made and handled. For the proper annealing of such castings as may require it, two annealing furnaces, each 35 feet long by 10 feet wide, are provided.

A fully equipped pattern shop and fire proof pattern storage buildings are located at points convenient to the

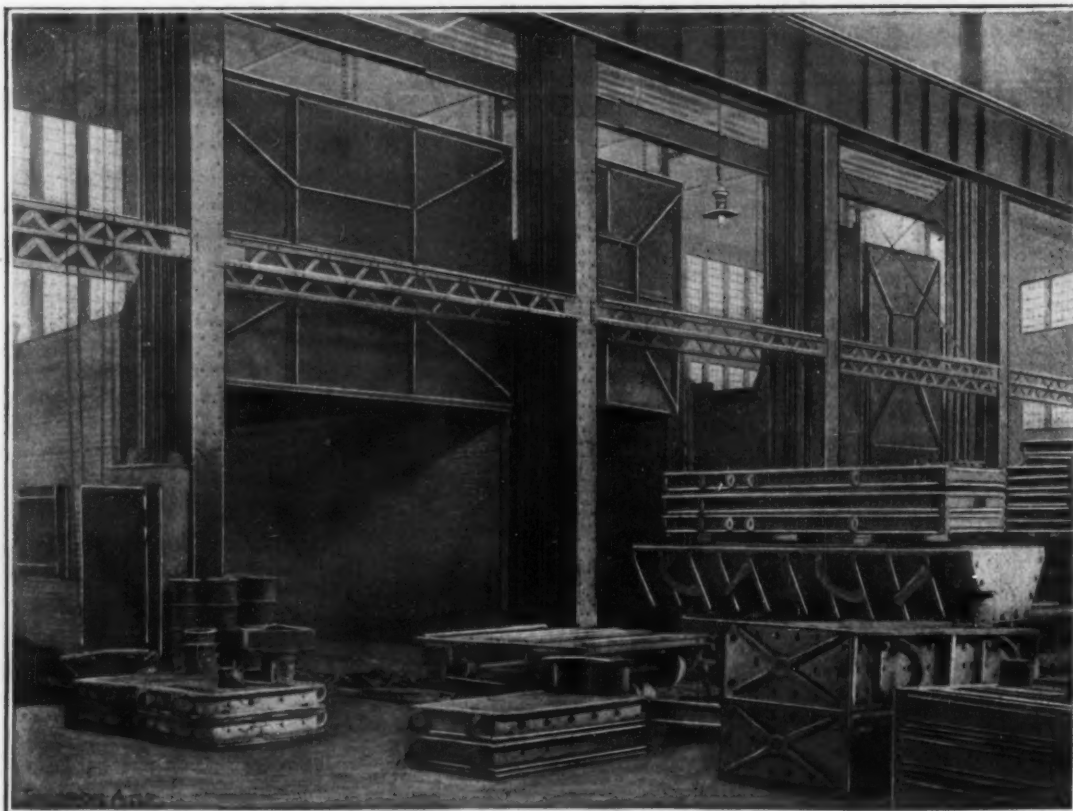


Fig. 2.—Drying Ovens.

NEW STEEL FOUNDRY OF THE PENNSYLVANIA STEEL COMPANY.

ing mills of the general plant, which are not far distant. Over the molding floors the cranes do all the handling, and narrow gauge tracks are provided on which to bring patterns from the storage building to the molding floor. At frequent intervals there are tracks for transferring molds, flasks, &c., from one bay to the other. Standard gauge tracks are run in at either end of the furnace bay for the purpose of receiving material and shipping product.

The great necessity of ample ovens for properly drying the molds for steel castings is fully appreciated by those in the trade and facilities for this work have been provided. There are two sets of four ovens, Fig. 2, each consisting of one oven 45 x 16 feet, one 45 x 10 feet 6 inches and two 45 x 7 feet 9 inches. The fires for heating these ovens have been placed in a subcellar, as it were, and so arranged about three sides of a rectangular room that one man can conveniently tend all the fires and thus heat the four ovens, an arrangement which is believed to be both economical and novel. Single standard gauge tracks run into the three smaller ovens, while four lines of standard rail, set to proper gauge, run into the larger ovens, thus allowing two cars to be run in

foundry, and a large machine shop, 200 feet long by 60 feet wide, containing all the necessary machinery for cutting off sink heads and finishing castings for shipment is provided at the lower or shipping end of the foundry. One of the largest pieces of machinery here in use is a 48-inch Wetherill cold saw, which is designed for work on large castings. Four smaller saws, open side planers, radial drill presses, slotters, lathes, &c., for finishing castings, together with two 20-ton traveling cranes and a number of air hoists, complete a most efficient outfit for finishing and shipping the output.

A gas producer plant with ample capacity is in operation, and great care has been taken with the arrangement of the ports in the melting furnaces, with the result that the flame in the furnaces can be easily and accurately regulated, and consequently the output of the furnaces kept uniform and of high quality. The fuel used for the producers is the best quality of Pennsylvania and West Virginia gas coal.

Just beyond the pouring floor is an especially inclosed space equipped with air hoists and trucks for the cleaning of castings by sand blast. Everything possible is

done to keep the air in the foundry free from dust, and so increase the comfort of the men and consequently the efficiency of the plant. In the lower end of the fur-

chline shop, where pneumatic chippers and emery wheels are used in finishing them for shipment.

At present the foundry is doing a large variety of

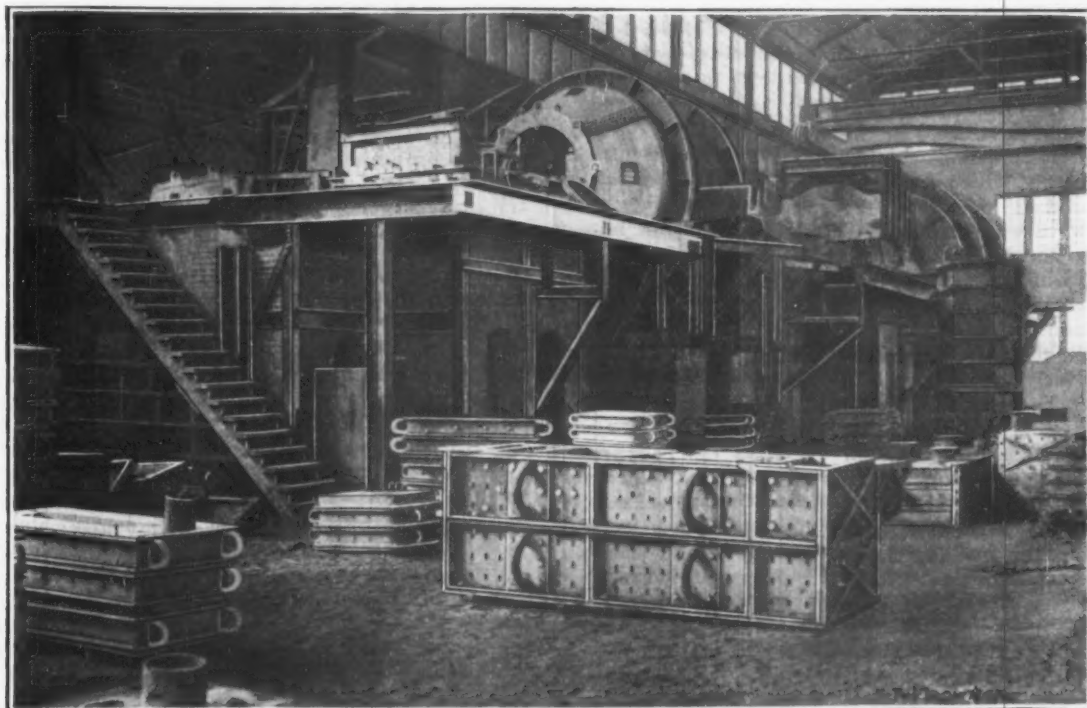


Fig. 3.—Open Hearth Tilting Furnaces.

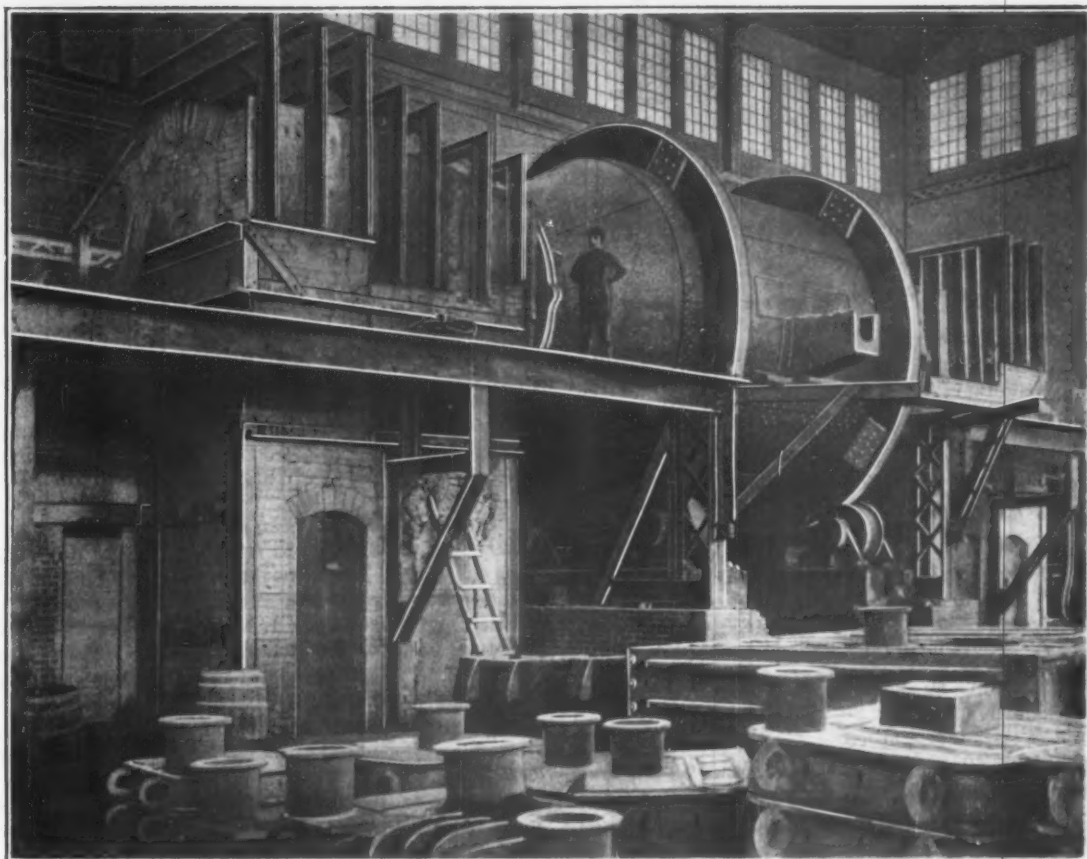


Fig. 4.—Another View of Furnaces.

NEW STEEL FOUNDRY OF THE PENNSYLVANIA STEEL COMPANY.

nace bay the castings are cleaned and prepared for shipping and for the machine shop. The smaller castings which require chipping go to the lower end of the ma-

chine shop, much of the product being street railway frogs, switches and mates, but it is also running on heavy crank shafts, riveter frames, ship and engine

castings, large pinions, gears, &c. On night turn the plant is operated on special ingot castings, both round and hexagonal, made especially for forging purposes, casting pits being conveniently located for handling pieces up to 27 feet long.

A flask yard, commanded by a crane, is situated at the side of the building, so that flasks can be stored when not in use and still be within easy reach when wanted. A glance at the accompanying plan, Fig. 5, will give a clear idea of the general arrangement of the foundry, and it will be seen that the work progresses continuously in one direction as nearly as possible. A piece passes from the molding floors through the ovens to the pouring floor, and, while the molds are returned by conveniently located transfer tracks to the molding floors the castings move along continuously to the sand blast, chipping floor and machine shop and thence to convenient points for shipping.

The plant throughout is operated by electricity, and all details have been made strictly up to date, the result being a foundry of large capacity and great facility of operation.

The United States Engine Company.—The United States Engine Company were organized at Parkersburg, W. Va., last summer with a capital of \$150,000, and all of the stock, we are advised, has been sold. The officers of the company are as follows: H. P. Boyd, president; Thos. Gartlan, vice-president; J. F. Boggs, treasurer, and Daniel L. Reese, secretary. The purpose of the company is to manufacture steam and gas engines, especially for the oil and gas trades, as well as a general line of goods used in these industries. The company secured by purchase 6 acres of land just north of Parkersburg, and have in course of erection and equipment a foundry, 70 x 140 feet; a machine shop, 80 x 160 feet; blacksmith shop, 40 x 80 feet, and a two-story wood working shop, 40 x 80 feet. The two larger buildings are of steel and brick construction, with concrete floors. These shops are modern in every detail. The company expect to have their works in operation not later than May 1.

A movement is on foot to organize a society of central station heating engineers.

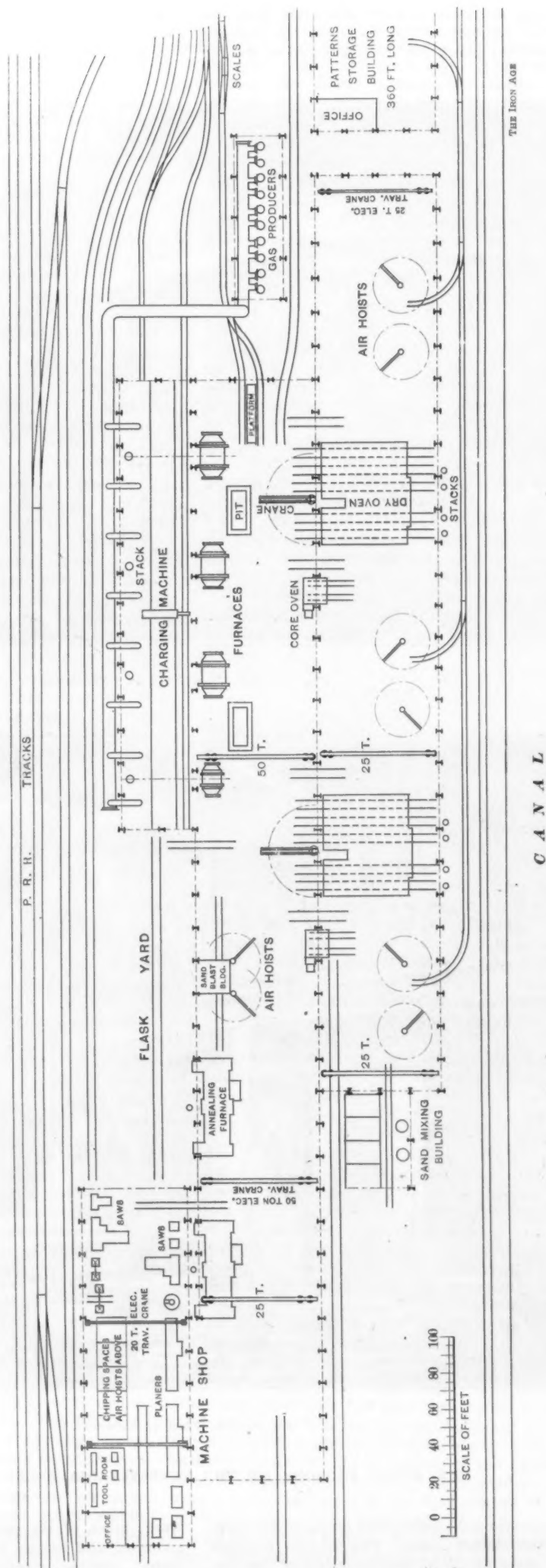


Fig. 5.—Plan.

NEW STEEL FOUNDRY OF THE PENNSYLVANIA STEEL COMPANY.

Amending the Drawback Laws.

WASHINGTON, D. C., January 28, 1902.—There will soon be introduced in Congress a measure which is the outgrowth of a movement that has been on foot for several months looking to the amendment of the drawback laws so as to enable manufacturers in all lines of trade to avail themselves more freely of these statutes for the purpose of securing and extending their export trade. The bill will meet specifically the objections to the present practice which have frequently been raised by prominent manufacturers who have found that in many cases the expense and inconvenience attached to the collection of drawbacks are so great as to make it wholly unprofitable to attempt to secure rebates of duty.

The Identity Clause.

The most serious difficulty encountered by manufacturers using imported materials in the manufacture of goods for export is the fact that section 30 of the Dingley act under which drawbacks are allowed, provides that "the imported materials used in the manufacture or production of articles entitled to drawback of customs duties when exported shall in all cases where drawback of duties paid on such materials is claimed, be identified, the quantity of such materials used and the amount of duties paid thereon shall be ascertained, the facts of the manufacture or production of such articles in the United States and their exportation therefrom shall be determined, and the drawback due thereon shall be paid to the manufacturer, producer, or exporter, &c." In the textile trade in particular it has been found to be practically impossible to absolutely identify the imported materials, for while in some cases the foreign character of the goods is obvious, in others the most skillful expert would be unable to distinguish the foreign from the domestic materials. Complete identification is also rendered more difficult by the further provision of the drawback law that "When the articles exported are made in part from domestic materials the imported materials or the parts of the articles made from such materials shall so appear in the completed articles that the quantity or measure thereof may be ascertained."

For a number of years the Treasury Department undertook to enforce this statute literally, and a large number of *bona fide* claims for drawback were denied on the ground that the term "shall so appear" in the law must be construed to mean "shall be evident from a physical examination." Subsequently, the National Lead Company appealed to the Attorney-General for a construction of this language and a decision was rendered to the effect that if an exporter could cause it to appear from an examination of his books and manufacturing records that he had actually used imported materials, such evidence might be taken in lieu of an examination of the finished goods themselves. This decision has broadened the rulings of the Treasury Department very materially, and has submitted to the privilege of drawback a great variety of exports.

It has still been found, however, that the necessity of tracing the foreign material by records or otherwise has deterred many manufacturers from taking advantage of the drawback laws. It has been found necessary, for example, to purchase raw materials from such importers as have preserved their import records in such a manner that certificates of importation can be secured by the buyer, and as only a few firms follow this practice the market for raw materials is very limited, and manufacturers are thus forced to import their own materials or forego the privileges of the drawback laws. In addition, the Treasury Department insists that stocks of imported raw material shall be kept separate from domestic materials, and this involves special storage facilities, records, &c. The outcome is that although manufacturers concede the necessity of the Department's regulations under existing laws, the drawback statutes are not doing the work they were intended to do, and a large amount of foreign business which would go to swell our dwindling exports is lost to the American producer.

Import Certificates.

It is now proposed to obviate all these difficulties by a simple statute of a few words authorizing a manufac-

turer in any line of trade to export with benefit of drawback goods representing raw materials to the amount covered by import certificates which he may be able to produce, without the necessity of identifying such materials in the finished product. Thus, a manufacturer presenting a certificate showing that he has imported a certain quantity of iron ore, or scrap iron, for example, would be permitted to export with benefit of drawback as much iron or steel as could be produced from such an amount of material. The cancellation of the import certificate upon the exportation of the goods would protect the Government against fraud of any kind, and the domestic producer of similar raw material would also be adequately safeguarded, as no more goods could be exported with benefit of drawback than could be manufactured from raw materials actually imported.

It is conceded, of course, that the effect of this law would be to cause the Government to pay a much larger sum in the way of drawbacks than is now paid, but as such disbursements would be made only on the basis of raw materials actually imported and finished products actually exported, there would be no loss to the Government or to the producer of domestic raw materials. The only gain made would be that of the domestic manufacturer and those depending upon him, who would be able to do a foreign business which they will not now attempt in view of the restrictions of the drawback laws and regulations.

It has been suggested that under such a law as is proposed domestic materials instead of foreign might be used and drawbacks paid thereon, but this objection is met by the fact that it is of no consequence either to the Government or the producer of domestic raw materials whether a given quantity of imported material is exported or is exchanged for a similar quantity of domestic material to be exported in lieu thereof. The bill to be introduced will be supported by a memorial signed by a large number of prominent manufacturers in various trades, and the Ways and Means Committee will be asked to grant an early hearing on the subject.

W. L. C.

The Bessemer Coke Company.

At the annual meeting of the stockholders of the Bessemer Coke Company of Pittsburgh, held in that city last week, contracts were approved for the building of 200 new coke ovens at their Griffin plant in the Klondike district of the Connellsville region, at a cost of \$100,000. An issue of \$200,000 of bonds was approved, and the purchase of 300 additional acres of coking coal adjoining the Griffin property was authorized. A few months ago the Bessemer Coke Company added 120 acres of coal lands to this plant, and the company will soon have 500 ovens at their Griffin works. The Bessemer Coke Company also own the Humphreys and Empire works in the Connellsville region, and also the Duquesne plant, located at Bradenville, altogether comprising 964 ovens, with an annual capacity of 600,000 tons of coke and facilities for the shipment of 200,000 tons of coal from the Duquesne plant, which is a feature of this works. The Bessemer Coke Company have a capital of \$2,500,000, and were started only a few years ago, the rapid growth and acquirement of property having been very marked. At the annual meeting last week W. Y. Humphreys was re-elected president; Joshua W. Rhodes, vice-president; Hermon Griffin, treasurer, and William Harris, secretary. E. H. Jennings, Dallas C. Byers and Robert L. Martin, with the above officials, comprise the Board of Directors.

A decision of some importance to bankrupts and their creditors has just been handed down at Milwaukee, Wis., by Judge Jenkins of the United States Court of Appeals for the Seventh district. Under this decision insurance policies issued under the semitontine plan become a portion of the assets of the estate of a bankrupt and must be surrendered to the creditors. This decision is rendered in the bankruptcy proceeding of David Welling of Chicago, reversing a decision of Judge Kohlsaat. The ruling will have the result of materially increasing the value of the estates of bankrupts who have insurance policies of this character.

Test of Texas Oil.

Prof. James E. Denton of Stevens Institute of Technology, Hoboken, N. J., recently made tests of oil from the Beaumont oil district of Texas for the Export Oil & Pipe Line Company of Beaumont, Texas. The tests were made at the suggestion and were carried on under the general direction of Henry M. McDonald of 100 Broadway, New York. They were made under a boiler, in comparison with coal, at an establishment in New York City, which is provided with three return tubular boilers. One of these boilers was used in the test. The boiler was of the return tubular type, 6 feet in diameter and 18 feet long, with 1900 square feet of heating surface. To raise 85 pounds of steam took 59 minutes with oil, and 1 hour and 17 minutes with coal and a "liberal amount of dry wood." The burner employed in the test was designed by T. H. Williams, and is shown in the accompanying engravings. After the oil test the boiler and furnace were examined, and no trace was found of any action of the oil on the boiler. There was no oily matter on the internal brick work, nor any discoloration of the latter, and there was less than 1-64 inch of soot in the tubes, which had been swept clear of coal ashes at the beginning of the use of oil.

The tests with the oil were made at capacities varying from 112 to 220 horse-power, which represented the limit of satisfactory air supply from the draft power of the chimney with a wide open damper—that is, up to 220 horse-power there was sufficient air supply to prevent any appearance of smoke in the flame or at the top of the chimney, but more than this horse-power caused curling streams of smoke to appear at the edges of the flame in the furnace, and a light gray vapor to be visible at the chimney top.

The tests with coal were made at 93 and 119 horse-power, the first amount being that demanded of the boiler for regular work, and the second the greatest amount that could be obtained with the dampers wide open.

Conclusions.

From the tests the following conclusions are drawn:

For a range of from 112 to 220 horse-power the total evaporation from and at 212 degrees per pound of oil varied from 15.71 to 15.29 pounds of dry steam, and the burner consumption varied from 3.1 to 4.8 per cent. of the boiler output, so that the net evaporation ranged from 14.74 to 15.16 pounds of water per pound of oil.

The combustion of the oil by the burner was practically perfect, since by the evidence of the heat balance the heat accounted for by the steam production, the hot gases flowing to the chimney, and a reasonable allowance for radiation represents about 98 per cent. of the total-heat of combustion of the oil when burned in oxygen in a calorimeter.

The boiler utilized about 78 per cent. of the heat of the fuel, which represents the best average boiler practice, and the percentage of steam consumed by the burners is a minimum for steam jet burners. An excess of cold air probably caused a loss of evaporation for the smaller horse-powers, but for the 189 and 220 horse-power tests there was no excess of the air necessary for complete combustion. Consequently for the two higher horse-powers the net evaporation of 14.8 pounds of water per pound of oil may be considered to represent the best economy that is to be expected from the use of the oil as a fuel with steam jet burners.

The evaporation from and at 212 degrees per pound of coal was 9.17 and 8.94 pounds of water for 93 and 119 horse-power. The coal afforded 11.6 per cent. of ash, and 14,680 B. T. U. per pound of combustible when burned in oxygen in a calorimeter, which represents an excellent No. 1 buckwheat. The firemen were the regular employees of the ice company. They were skillful operators, and secured practically complete combustion of the coal, as is shown by the absence of carbonic oxide in the furnace gases, and the fact that the radiation and imperfect combustion item of the heat balance is 3.4 per cent. Considering that the coal was laden with 6.2 per cent. of moisture, and was consumed in the furnace to about 17 per cent. of ash, the evaporative results per

pound of wet fuel are excellent. They correspond to an evaporation of 11.79 pounds from and at 212 degrees per pound of combustible, which affords the very excellent boiler efficiency of 77.6 per cent.

Had the draft been sufficient to burn enough coal per hour to produce about 10 horse-power per square foot of heating surface, as in the case of the 189 horse-power test with the oil—and as is commonly guaranteed in the sale of modern boilers—the boiler efficiency would probably be reduced on account of the greater velocity of the heated gases over the heating surface resulting in a higher chimney temperature, and hence the waste of a greater proportion of the heat of combustion. Such reduction of efficiency would probably have made the evaporation per pound of wet coal only about 8.5 pounds. But had the percentage of moisture in the coal have been the average amount, or 3 per cent., the evaporation would have been about 8.75 pounds.

Comparative Cost of Coal and Oil.

The comparative fuel costs of coal and oil for the particular conditions of the ice factory where the tests were conducted are therefore as follows:

For producing the horse-power required by the factory, or 1 horse-power per about 20 square feet of heating surface, with the moisture and ash as found:

1. Moisture in coal, per cent. 6.2
2. Ash, per cent. 16.2
3. Weight of oil per gallon, pounds. 7.66
4. Weight of oil per barrel of 42 U. S. gallons, pounds. 322
5. Evaporation per pound of wet coal from and at 212 degrees, pounds. 9.17
6. Net evaporation per pound of oil from and at 212 degrees, pounds. 15.1

$$7. \text{Ratio of oil to coal} = \frac{15.1}{9.17} = 1.65$$

8. Number of barrels of oil equivalent to 2240 lbs. of coal. 4.23
9. Price of coal per 2240-lb. ton, without cartage and cost of ash removal. \$3.00
10. Equivalent price of oil per barrel of 42 U. S. gallons. \$0.71

For producing horse-power upon the commonly guaranteed basis of 1 horse-power per 10 square feet of heating surface, and with an average percentage of moisture and ash in the coal:

1. Moisture in coal, per cent. 3
2. Ash, per cent. 17
3. Evaporation per lb. of wet coal from and at 212 degrees, pounds. 8.75
4. Net evaporation per lb. of oil from and at 212 degrees, pounds. 14.8

$$5. \text{Ratio of oil to coal} = \frac{14.8}{8.75} = 1.69$$

6. Number of barrels of oil equivalent to 2240 lbs. of coal 4.12
7. Price of coal per 2240-lb. ton, without cartage and cost of ash removal. \$3.00
8. Equivalent price of oil per barrel of 42 U. S. gallons. \$0.73

Chemical Tests of Oil.

Samples of oil were collected from each barrel as it was emptied into the storage tank. A mixture of these was tested in the laboratory to determine the following data:

Specific gravity.....	0.920
Flash point, degrees F.....	142
Burning point, degrees F.....	181
Cold test, degrees F.....	-6
Calorific value per pound by oxygen calorimeter, B. T. U.	19,060
Carbon, per cent.....	84.60
Hydrogen, per cent.....	10.90
Sulphur, per cent.....	1.63
Nitrogen, per cent.....	0.00
Oxygen, per cent.....	2.87

Effect of Sulphur upon Boiler.

Excellent Pittsburgh coal contains as high as 1.7 per cent. of sulphur, and its use affords the average period of the life of boilers. In generating equal horse-power with such coal the amount of sulphur in the furnace gases will be the same with the oil as with this coal, if the sulphur in the oil is as high as 2.6 per cent., which considerably exceeds the proportion of sulphur in the oil. An excellent grade of Indiana coal with 3.5 per cent. of sulphur is used on locomotives without being identified with any greater depreciation of the life of fire boxes than occurs with the best Pittsburgh coal. The equivalent of the sulphur in this Indiana coal for providing equal horse-power with the oil is 6.9 per cent. In view of these facts there need be no apprehension of shortening the life of boilers by use of the oil. Sulphur in coal in excess of 2 per cent. is productive of an excessive

amount of clinker, and makes a "dirty" fire, but there is no equivalent of this effect on account of sulphur in the oil.

Labor Saving by Use of Oil.

It is probable that one fireman can attend to 30 oil burners of 100 boiler horse-power each. This fact will permit a saving for firing labor in hand firing plants of more than about 500 horse-power capacity, and of more than about 1000 horse-power capacity in mechanical

A pool of oil spilled upon a board cannot be ignited by a match. The latter extinguishes itself when the match is partly burned. The instant the match comes in contact with the oil, air is excluded from its lower surface so that the flame is above the oil, and it cannot therefore vaporize sufficient of the latter to bring vapor into contact with the flame of the match and ignite.

A splinter of dry wood, about $\frac{1}{4}$ inch square and 6 inches long, ignited at one end, will not ignite oil in a shallow dish, but when this splinter is smeared with oil

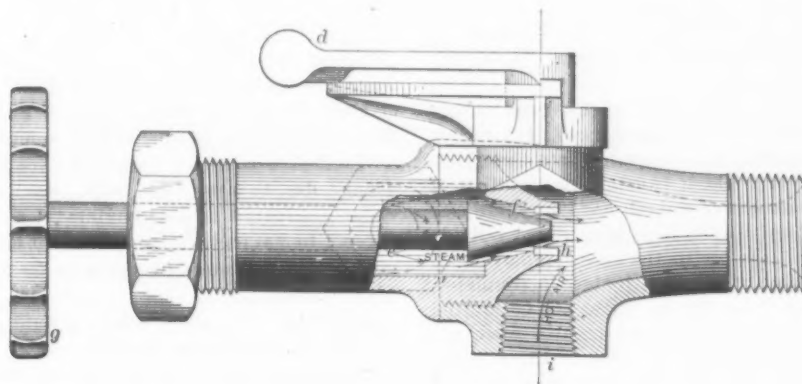


Fig. 1.—Horizontal Section of Williams Burner.

stoker plants. This saving will, under average conditions of coal and wages, amount to about 15 cents per ton of coal used for power in excess of 500 horse-power in hand fired boilers, and in excess of 1000 horse-power with mechanical stokers. There will also be a saving in ash handling labor, or helpers in the fire room, which will probably be about one-fourth of the above amount. In cities the cost of carting away ashes will be saved.

the latter burns rapidly over the length of the splinter after the end of the latter is ignited to a blaze by a match. The flame at the end of the splinter vaporizes the film of oil near it, so that the vapor floats into contact with the flame and ignites. This vapor in burning vaporizes and ignites the film further along the splinter, until the oil over the whole length of the latter is aflame.

The principle governing ignition of a mass of oil be-

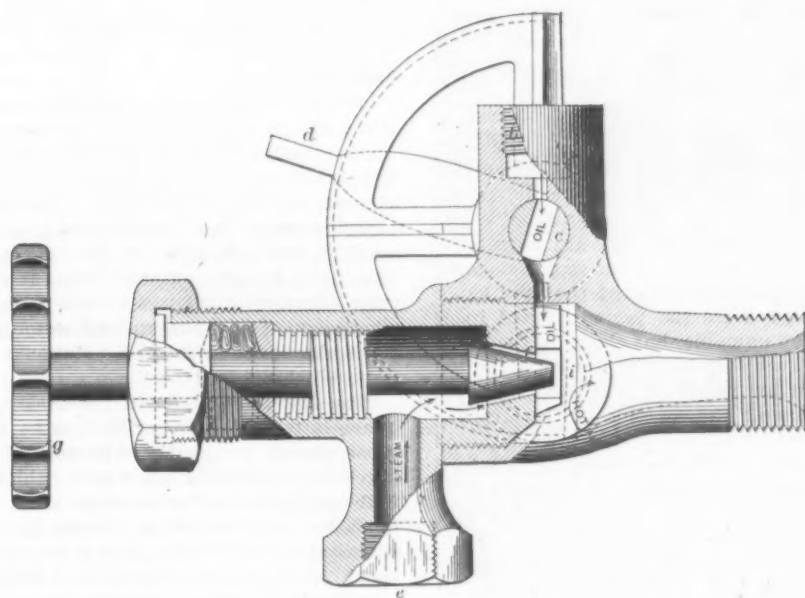


Fig. 2.—Vertical Section through Center of Burner.

TESTS OF TEXAS OIL.

This amounts to about 10 cents per ton of all coal used. There will also be a saving in furnace repairs, which may amount to 2 cents per ton of coal. The cost for handling the oil will probably be less for machinery than for coal, but much for ground space, required for underground storage tanks.

Danger from Use of Oil.

Experiments with samples of the oil used for the evaporative tests show the following results regarding its inflammable qualities:

low a body of air is that the oil must be vaporized and the vapor come into contact with a temperature above a red heat. For example, a pan 10 x 14 inches filled with oil to a depth of about 1 inch, had a handful of blazing waste, saturated with kerosene, thrown into it. The blaze of the waste was extinguished on its lower surface where contact with the oil excluded the air. Hence about 40 seconds elapsed before sufficient heat was imparted to the oil, by radiation and conduction from the burning waste, to vaporize enough oil to cause vapor to rise into contact with the blaze and ignite. Then the

burning of this vapor rising from the surface of the oil immediately about the waste vaporized and ignited oil further away, and thence the whole surface of oil was set blazing. The liquid oil then became heated throughout by conduction, and all of it gradually vaporized and burned. After the pan of oil was once aflame if it was extinguished by covering the pan, the hot liquid continued to evolve vapor, so that a match thrown on the surface instantly reignited the whole of it.

These experiments only serve to show that oil spilled to form a liquid pool, at ordinary temperature, about a boiler room, would not be ignited by a lighted match, or a hot coal, falling into it, and that even a lighted torch would have to be in contact with it for several seconds before it would inflame.

Some glass fruit jars, partly filled with oil, were kept at ordinary temperature for upward of ten days. Lighted matches were then dropped into them through a $\frac{1}{2}$ -inch hole in the cover without causing any ignition of the contents of the space above the oil, nor was there any flame caused by holding the lighted match just outside the hole in the cover. Also with the cover removed, so as to expose an opening of about 3 inches in diameter, the contents of the jar above the oil could not be ignited by the flame of a match. The same results were obtained with the oil at 100 degrees F., and no vapor could be seen escaping from the jar. These results showed that up to 100 degrees of temperature the oil did not vaporize sufficiently to make a burning mixture of the air above the oil in a half filled fruit jar. That is, the oil vapor present was too greatly diluted with air to be inflammable.

At temperatures of oil from the flashing point, 142 degrees, to 200 degrees F. vapor was visible as it escaped through the $\frac{1}{2}$ -inch hole in the cover, which ignited with a match, and burned so as to form a feeble flame. This flame could not be blown inside of the cover, nor would a lighted match dropped through the cover affect the contents of the jar. These results showed that above 142 degrees F. the oil vaporized sufficiently to drive out the air from the jar and fill the latter with vapor, which could not burn within the jar, as no air was present to support combustion; but on issuing from the jar and mixing with air the vapor could burn.

With the cover removed the application of the flame of a match to the vapor floating out of the jar would not ignite it at 1 inch or more above the outlet, but applied at the outlet the contents of the jar above the oil ignited, and burned with a sluggish flame for about a second, when combustion ceased. The upward current of vapor was then re-established, and the ignition could then be repeated. These results showed that the vapor in floating about 1 inch from the jar so diluted itself with air that it was inflammable, but closer to the jar it formed a burning mixture with the air, and being ignited at this point sufficient air found its way into the wide mouth of the jar to enable the contents of the latter to inflame. Then the upward current due to heat excluded the entrance of air, and combustion ceased, after which the upward vapor currents re-established themselves.

The experiments with the vapor of the oil show that its volatility does not give rise to inflammable vapor until it is heated above 142 degrees F. Then, as the vapor is essentially identical with that given off by gasoline at ordinary temperatures, all the well-known safety precautions for the storage and handling of the latter substance apply to the oil, although the rapidity with which vapor is given off per square foot of surface is much less with the oil than with gasoline.

In 1900 British Columbia produced 231,089 ounces of gold, valued at \$4,732,105. In 1901 the estimated production was 270,900 ounces, valued at \$5,596,700. The production of silver was 3,958,175 ounces in 1900, and 4,685,718 in 1901. For copper the figures are 9,997,080 and 30,736,798 pounds, respectively; for lead, 26,679 net tons and 25,265 net tons, respectively; for coal, 1,439,595 gross tons and 1,529,210, and for coke, 85,149 and 134,760 gross tons, respectively. The total value of the mineral production was \$16,344,751 in 1900 and \$20,713,501 in 1901.

The National Bureau of Standards.

WASHINGTON, D. C., January 28, 1902.—The National Bureau of Standards is about to issue its first circular of information to the general public, outlining the work it is now prepared to undertake. The bureau was organized July 1 last, under the act of March 3, 1901, and is authorized to exercise its functions for the Government of the United States, for any State or municipal government within the United States, or for any scientific society, educational institution, firm, corporation or individual within the United States engaged in manufacturing or other pursuit requiring the use of standards or standard measuring instruments. For the present, however, the work of the bureau will be limited to the comparison of the following standards and measuring instruments, either for commercial or scientific purposes:

Length Measures.—Standard bars from 1 to 10 feet, or from 1 dm. to 5 m.; base bars; bench standards; leveling rods; graduated scales; engineers' and surveyors' metal tapes 1 to 300 feet, or from 1 to 100 m.

Weights.—From 0.01 grain to 50 pounds, or from 0.1 mg. to 20 kg.

Capacity Measures.—From 1 fluid ounce to 5 gallons, or from 1 milliliter to 10 liters.

Thermometers.—Between 32 and 120 degrees F., or 0 to 50 degrees C.

Polariscope Apparatus.—Scales of polariscopes, quartz control plates and other necessary apparatus.

Hydrometers.—Alcoholometers, salinometers and saccharometers, whose scales correspond to densities between 0.85 and 1.20.

Resistances.—Standard coils of the following denominations: 1, 2, 5, 10, 100, 1000, 10,000, 100,000 ohms; low resistance standards for current measurements of the following denominations: 0.1, 0.01, 0.001, 0.0001 ohms. Coils of resistance boxes; potentiometers; ratio coils.

Standards of Electro Motive Force.—Clark and other standard cells.

Direct Current Measuring Apparatus.—Millivoltmeters and voltmeters up to 150 volts; ammeters up to 50 amperes.

For all comparisons, calibrations, tests or investigations, except those performed for the Government of the United States or State governments, a reasonable fee will be charged. It is the desire of the bureau to cooperate with manufacturers, scientists and others in bringing about more satisfactory conditions relative to weights and measures in the broader meaning of the term, and to place at the disposal of those interested such information relative to these subjects as may be in possession of the bureau. All communications and articles should be addressed "National Bureau of Standards, Washington, D. C."

The bureau will be in possession of its permanent quarters within the next 12 months, when the scope of its work will be greatly enlarged. Plans are being prepared for a physical laboratory, which will be equipped with apparatus and conveniences for carrying on investigations and for testing standards and measuring instruments of all kinds. Also a somewhat smaller building, to be known as a mechanical laboratory, which will contain the power and general electrical machinery, the instrument shop, refrigerating plant, storage batteries, dynamos for experimental purposes, and laboratories for electrical measurements requiring heavy currents.

Ultimately the bureau will, in addition to caring for the standards of weights and measures, be charged with the comparison of standards used in scientific investigations, engineering, manufacturing, commerce and educational institutions with the standards adopted or recognized by the Government; the construction, when necessary, of standards, their multiples and subdivisions; the testing and calibration of standard measuring apparatus; the solution of problems which arise in connection with standards; the determination of physical constants and the properties of materials, when such data are of great importance to scientific or manufacturing interests and are not to be obtained of sufficient accuracy elsewhere.

W. L. C.

Pacific Coast News.

SAN FRANCISCO, CAL., January 20, 1902.—Manager Dodd of the Union Iron Works is of the opinion that the present strike, or as much as is left of it, will take the same course as the molders' strike in the early nineties. This lasted about two years—that is, the show of opposition was kept up for two years, when it and the strike were abandoned together. Some of the strikers have been reduced to the greatest stress already and they will probably go back in one way or another, most of them during the next few months. The number out at present is about 2500, so that most have abandoned it already. Of course there is a greater proportion of machinists out than of other lines that were employed with them, and they will suffer most. They have been now out eight months. That to the average machinist means \$735 in wages. Just think of it, and allowing that the 2500 still out averaged \$18 a week, or \$3 per day, that means \$1,575,000. Why, that sum would serve to equip several large establishments as matters go in San Francisco, and all this would have been avoided by a little conciliation and common sense on the part of the victim, and in the end the nine-hour day would have come. This is in a nutshell the expression of opinion of one among the leading men in the iron trade. This gentleman at first thought that the strike would last but a few days, and he is a real friend of the workmen, though compelled to oppose what he considers their arbitrary and unreasonable conduct. This is still in evidence. The union men have been called off the transport "Thomas" because she was sent over to the Union Iron Works for a general overhauling. About 50 ship joiners, ship fitters and machinists were called off the vessel and obeyed the order of the union. The Government officials, however, got in one day's union work, as the officers of the Machinists' Union were not allowed to enter the transport dock or the Union yards. They were at last taken off, and so it goes. Of course this simply injures these mechanics except in as far as it harms San Francisco by driving work away from it.

There has been somewhat of a lull in business circles on account of annual stock taking and the preparation for another year's campaign, but this is no indication of a falling off in business. On the contrary, all the houses have all the work ahead of them that they can reasonably handle, and this promises to be the most prosperous year that we have had since 1890. Especially is this true of the iron and metal trades and hardware. The outlook for agricultural implements is excellent, too, as we had good crops last year, and as the dry weather which prevailed has been broken, we will have good crops this year, too. Until the rains of the week matters were rather doubtful in this direction and they are still so in the South. But a little more rain will make matters right there, too. The demand for tools and machinery used in drilling for oil will be good, despite the fact that the business has been under somewhat of a cloud for a few months. But the year has kept up to expectations, as the yield has been 8,742,500 barrels, or twice that of 1900. Every little while there are reports of large sales of oil land or of the production of big wells, and matters are improving steadily. Many new sections are being tested by the drill of the prospector and as fast as success is met with crowds will follow in the wake of the lucky man. As to general business, it may be said to be very good for this time of the year, and the clearing house operation tells the story eloquently. Since the first of the year the clearings have been as much as 20 per cent. in excess of those for the same time in 1900, while these in their turn were far ahead of 1899.

The drop in copper has been already detrimental to the business in this State and in Arizona, where men have been laid off in consequence of it. The development on this coast was caused by the advance a couple of years since, and if the market kept down it would interfere with the industry materially. This industry has been very successful during the past two years, and in 1901, though the figures have not yet been made up by the Mining Bureau, the yield of copper has been in

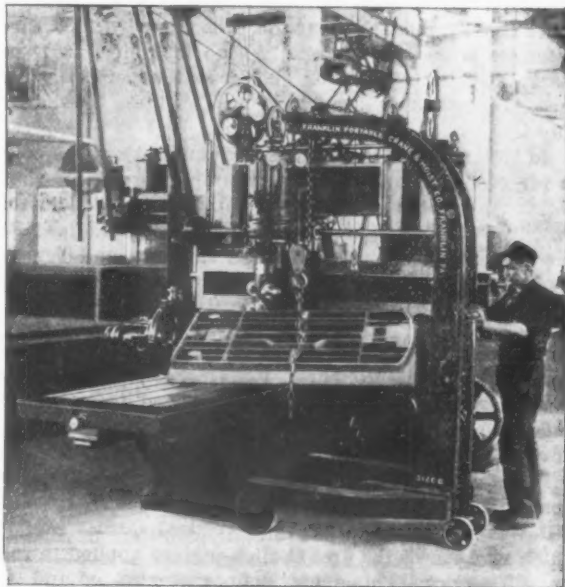
the neighborhood of 35,000,000 pounds, principally from Shasta County. Meanwhile a company have been organized in Los Angeles to develop the copper property in Jerome Canyon. There are eight claims to be worked.

The iron mines at the Minarets are attracting general attention throughout the State, now that Eastern capital has been enlisted in their development. It is said, too, that there exist lodes of copper ore and other metals as well. Iron will attract more attention now in consequence of the decline in copper, and, indeed, the superior attraction of gold mining and copper mining have been one of the reasons that have kept back the development of our iron properties so long. But 12-cent copper and dollar oil will help out the iron business in manufacturing the iron where it is extracted from the ore and inducing the exploitation of the rich ores that are found all the way from Telachapo to the borders of Oregon.

J. O. L.

The Franklin Portable Crane.

The Franklin portable crane and hoist consists of a V-shaped base from which rises a curved overhanging arm. The winding drum is placed between the sides of



THE FRANKLIN PORTABLE CRANE.

the arm, near the base, the chain extending over guide rollers to the outer end of the arm and from thence to the hook. The crane is mounted upon four wheels, one pair of which is carried by a swiveled axle provided with a handle for moving the device from place to place. It will be observed that the crane is so constructed that the base may be run under a machine, such as a lathe or planer, so that the overhanging arm will deposit the load at any desired place on the machine. The crane is particularly serviceable for handling and transporting work in localities not reached by the regular travelling crane. It is made in several sizes and capacities by the Franklin Portable Crane & Hoist Company of Franklin, Pa.

The Orford Copper Company protested against a decision of the Collector of Customs at New York, under which duty of 25 per cent. ad valorem was assessed on scrap metal, consisting of the shells of exploded cartridges of Mauser bullets. These were found to contain approximately 80 per cent. of copper and 20 per cent. of nickel. It was held that they were dutiable under the clause which assesses 25 per cent. on "argentine, albatay or German silver, manufactured." It was claimed that the material ought to enter free, on the ground that it was a composition metal of which copper is a component material of chief value. Testimony showed that the material is not German silver, because it contains no zinc. The protest was sustained.

The Pencoyd Works.

On the occasion of the reception tendered to Percival Roberts, Jr., in commemoration of 25 years' active interest in and management of the A. & P. Roberts Company, a souvenir was prepared which contained the following account of the development of the Pencoyd plant:

The erection of the Pencoyd Iron Works was commenced in the year 1852 by Algeron Roberts and Percival Roberts, at Pencoyd, Lower Merion Township, Montgomery County, Pa. Later George Theodore Roberts became a member of the firm. He retired from the business in 1883. Algeron Roberts died November 5, 1868. The firm name was A. & P. Roberts & Co. until November 26, 1894. On that date the A. & P. Roberts Company were incorporated under the laws of the State of Pennsylvania, with Percival Roberts as president. His death occurring March 30, 1898, he was succeeded by Percival Roberts, Jr., who held this position until the time of his resignation, May 24, 1901.

Forges.

The first products from these works were in the shape of forgings—hammered car and locomotive axles forming an important part of the output. This product increased annually. After 1886 but few iron axles were forged. Steel rapidly took the place of iron, and by 1900 three hammers were forging from 1800 to 1920 steel axles per week, working eight-hour shifts, making 40 axles per turn. In 1901 this branch of the business was abandoned.

In 1889 a 20-ton hammer of German make was erected to forge steel ingots to shapes suitable for the finishing mills. As but 60 tons per turn could be handled in this way, it proved inadequate for the purpose, and since 1891 has been used for miscellaneous forgings and for the preparation of scrap for the melting furnaces.

Rolling Mills.

In 1856 an 18-inch two-high bar mill was installed to work scrap iron into bars. Rolls for tees, angles and other shapes of medium size were added from time to time. It continued in service until 1895, when it was removed and discarded.

In 1859 a two-high rolling mill and puddle furnaces were added for the production of puddled iron. This mill was driven by a 24 x 36 vertical Corliss engine, which was one of the first Corliss engines applied to rolling mill service. This department was extended and improved at intervals until 1895, at which time it contained one single and 15 double puddle furnaces, two sets of 20½-inch three-high rolls and one rotary squeezer, and producing about 330 tons of puddle bars per week. In this year it was removed and the manufacture of iron abandoned.

In 1875 a 23-inch three-high roll train was erected for the manufacture of structural shapes. It was supplied by three heating furnaces of ordinary type. With the exception of replacements due to necessary repairs, and the addition of three electric cranes, there have been but few changes in the operations of this mill. Its early production was from 250 to 400 tons per week. Its output in 1901 is from 700 to 900 tons of finished material per week. The shapes used in the construction of the Centennial Exhibition buildings in 1876, and for the first Elevated Railroad in New York City, were some of the early products of this mill.

In 1876 a 12-inch three-high roll train was built for guide iron, small bars, angles, tees, &c. It was supplied by two ordinary heating furnaces, which were removed in 1896, and a new type of continuous heating furnace was erected, which, with other additional facilities, aided in increasing the output, which in 1901 is from 500 to 570 tons of finished material per week.

In 1884 a 20-inch three-high finishing mill, equipped with regenerative gas heating furnaces, was installed and continued in successful operation, turning out 500 tons per week, until 1894, when it was entirely removed, and in its place was erected what is known as the 23-28 inch mill, consisting of a 28-inch two-high reversing roughing mill and a 23-inch three-high finishing mill,

each driven by 30 x 36 double reversing engines, geared to the mills. The mill is supplied with electrically driven roller tables; 40-ton overhead crane for changing rolls and housings; three regenerative gas heating furnaces, with necessary gas producers; two electric charging machines, &c. Its weekly output of finished material is from 2000 to 2600 tons. Angles are rolled up to 190 feet long; beams to 100 feet long; blooms being used for this purpose of from 1150 to 6000 pounds weight.

In 1891 a 36-inch two-high mill with double reversing engines, power driven roller tables, manipulators and heating furnaces, was completed to prepare steel for the finishing mills. The product of this mill in 1901 is about 3800 tons of blooms and billets per week.

Steel Mill.

In 1887 a regenerative furnace of 15 tons capacity was completed for the manufacture of acid open hearth steel. On July 12 the first heat of 8270 pounds of steel ingots was cast. Shortly afterward a second furnace was completed.

In 1889 the No. 1 furnace was rebuilt and changed to 20 tons capacity. A third furnace was started October 30, 1891, and a fourth furnace on May 10, 1892, both of 25 tons capacity. The output at this time was 615 tons per week.

As a result of experiments made in 1893, the No. 1 furnace was rebuilt to arrange for making basic open hearth steel, and on September 13 the first melt of basic open hearth steel ingots was cast. In the same year No. 2 furnace was also changed from acid to basic.

In 1895, to supply the increasing demand for steel, four additional 30-ton basic open hearth steel furnaces were completed and put in operation, as follows: Fifth furnace on April 11, sixth furnace on April 26, seventh furnace on September 26, eighth furnace on November 8. In 1896 furnace No. 3 was rebuilt, the lining changed from acid to basic, and first melt cast on July 25. In 1897 the ninth furnace was completed, and first melt cast on January 22, 1898. In 1898 No. 4 furnace was rebuilt, and the lining changed from acid to basic, first melt being cast on March 11. From that time, when the weekly production was about 3000 tons of ingots, the output of this department has been basic open hearth steel.

In 1898 a tilting furnace of 75 tons capacity and the necessary cupolas for melting pig iron, gas producers and other appliances, were installed, to make steel by a continuous process, and on September 3, 1899, the first steel was cast from this furnace. In 1900 the eleventh furnace was erected, and cast the first melt on March 12.

The plant now consists of ten open hearth furnaces, each of about 30 tons capacity, and one tilting furnace of 75 tons capacity, giving an output of 4600 tons of ingots per week.

Bridge and Construction.

In the year 1859, under the title of the Bridge Company, the manufacture and erection of wrought and cast iron bridges was commenced. They were the only firm at that time engaged in the manufacture of iron bridges. Some of the iron entering into these structures was furnished by the Pencoyd Iron Works; the balance was handled elsewhere, as well as the manufacture and fitting of the several parts.

In 1882 a small shop was erected at Pencoyd, at the upper end of the 23-inch mill building, for punching beams and channels for structural purposes. This was continued until the year 1886, when a shop with the necessary machinery and tools was completed for the manufacture of railroad bridges, viaducts, &c., which soon gave an output of 300 tons per month. In 1888 the shop was extended and turned out 600 tons of finished material per month. In 1890 the building was again increased in size, and the product likewise to 2000 tons per month. In 1894 this shop was remodeled and doubled in size, making a building 448 feet long by 200 feet wide. The efficiency of the shop was increased by the installation of advanced modern methods; the old machinery was rearranged; new and especially designed machines put in; the power was changed from steam to electricity, by which a machine could be operated independently of any others; electrical power hoists and reamers and pneu-

matic riveters and tools have been supplied in profusion, and every new feature is added that will aid in turning out the best work.

In the operating of this shop efforts are made to have the material handled with the greatest possible speed and safety. In the process of fabrication, the material is taken in the shop at one end and steadily moves toward the other end, where it is taken out finished, loaded on cars by two 30 tons capacity overhead cranes, and shipped away. In 1901 the capacity of the bridge and construction department has increased to 7000 to 8000 tons of finished material per month.

Bridge and Construction Forge Shops.

RIVETS, BOLTS, FORGINGS.

Rivets and bolts were first manufactured at Pencoyd in 1889. The output from three rivet machines and one bolt machine, in August, 1890, was as follows:

Pieces.	Weight.		
.... 160,237 lbs. of rivets	$\left\{ \begin{array}{l} \frac{1}{2}'' - 1,570 \\ \frac{3}{4}'' - 45,941 \\ \frac{7}{8}'' - 112,726 \end{array} \right\}$	For August, 1890	
4,668 5,268 " " bolts		" " "	" " "

New machines have been built on original lines, designed to increase the output and to lessen the cost of production. To illustrate the growth of this branch of industry, the following statement shows the production for August, 1901, from four improved bolt and rivet machines:

Pieces.	Weight.		
..... 852,440 lbs. of rivets	$\left\{ \begin{array}{l} \frac{5}{8}'' - 2,650 \\ \frac{3}{4}'' - 321,031 \\ \frac{7}{8}'' - 528,759 \end{array} \right\}$	For August, 1901	
197,644 216,949 " " bolts		" " "	" " "

In 1893 the first solid steel sleeve nuts were forged to take the place of wrought iron for bridge work. This department also manufactures miscellaneous forgings for bridge work and for machinery. In August, 1901, 5700 pieces, weighing 38,119 pounds, were turned out. Fuel oil has been largely used in this department for heating purposes since 1890.

The Eye Bar Shop

contains a complete equipment of hydraulic machinery, embracing pumps, accumulators, upsetting machine and shearing, punching, rolling, straightening and boring tools, and the necessary heating and annealing furnaces. This plant, which originated in 1890, was designed for the manufacture of eye bars up to 8 inches wide, with heads 18 inches in diameter. Recently a hydraulic testing machine has been added, with a pulling capacity of 600 tons, operating on bars 40 feet long. In January, 1891, 242 heads or 121 eye bars were upset. In August, 1901, 1732 heads or 866 eye bars were made.

Electric Power and Lighting.

The primitive hand torch furnished artificial light for operations at night until the year 1882, when the first dynamo was installed. It was located overhead in the lower end of the present machine shop and furnished current for ten arc lamps. In January, 1886, an electric light station was established at one end of the blacksmith shop, another dynamo placed therein, and 25 additional arc lamps distributed throughout the works. About the same time a dynamo was put in to furnish 300 incandescent lights for the offices, machine and bridge shops.

In 1889 the electric light station was removed to a new building erected on the site of the present power station, and an additional 35 arc light dynamo installed. In this year electricity for power was first used, and a 20 horse-power 110-volt generator and a 10 horse-power motor were placed in the bridge shop to drive an eight-head multiple drill gantry.

In 1891 a 20-ton overhead electric traveling crane was placed in the blooming mill. This was the first crane of this character put in service at Pencoyd. A 30-kw. generator was also added to the plant, and motors distributed in the mills for driving machinery. In 1892 a 6-ton overhead traveling crane was installed to cover the space between the 12 and 20 inch mill building and the machine shop, and used for loading material on cars for shipment.

During the succeeding years there was a gradual displacement of shafting, belting, engines, &c., and the sub-

stitution of electric motors connected direct to individual machines; power being obtained from a central plant in which the generating units were added to, until at date, in place of one 30-kw. unit, there are now installed five 220-volt generators of 1100 kw. capacity, furnishing power for 67 cranes equipped with 159 motors, six charging machines—20 motors, in addition to 387 motors distributed throughout the works, 300 arc lights and 2000 16 candle-power incandescent lamps, aggregating 4645 horse-power of motors, ranging in size from 1-6 to 125 horse-power.

Boilers and Engines.

Up to 1880 steam for power was generated in boilers placed over heating and puddling furnaces, utilizing the waste heat of same.

In 1882 the first auxillary water tube boilers were erected (312 horse-power, which was added to from time to time). At the present time there are more than 6000 horse-power boilers required, consuming 5000 tons of coal per month, evaporating 170,000 pounds of water per hour. These are equipped with modern automatic stokers, coal and ash conveyors, water purifying and heating appliances.

In 1852 one 50 horse-power engine, driving a tilting hammer and a blower for furnaces, furnished all the power required. In 1901 more than 12,000 horse-power of engines are in use, in addition to 4000 horse-power of electric motors.

In 1852 a small creek emptying into the river close to the mill, supplying about 50 gallons of water per minute, furnished more than was needed for steam and other purposes of the works. In 1901 8,000,000 gallons for 24 hours, drawn from the river, are consumed, requiring 37 pumps of various sizes.

Producers.

In 1884 the 20-inch mill was built, bringing into service the first furnaces using producer gas. In 1901 65 producers are in use, consuming more than 8000 tons of coal per month; five of these are mechanical producers recently erected, consuming 2400 pounds of coal per hour, at reduced cost of labor, compared with 400 pounds per hour used on former type of producer.

Important accessories for the successful operation of the several departments are: The machine shop, pattern, templet and carpenter shops, iron, steel and brass foundries, blacksmith shops, roll turning department, physical and chemical laboratories, tool rooms, electrical repair shops, and all other features which may help the works to be self sustaining as far as possible. When break downs occur, repairs are handled quickly, and constant endeavors are made to keep the works running continuously, for the mutual benefit of the company and the 2900 employees.

Export Shipments for Years 1894 to 1901 Inclusive.

	Japan.	So. America.	Africa.
1894.....	.....	190,919	.....
1895.....	.....	2,862,593	.....
1896.....	.....	.....	.....
1897.....	13,728,983	.....	.....
1898.....	3,038,579	.....	.....
1899.....	14,888,596	.....	1,395,639
1900.....	5,223,518	213,626	.....
1901 (six months)....	.....	50,200	12,000,000
Totals.....	36,879,676	3,317,338	13,395,639

	Canada.	Mexico.	Sweden.	Australia.
1894.....	.....	.....	.....	.....
1895.....	.....	.....	.....	.....
1896.....	.....	.....	.....	.....
1897.....	2,250,000	39,200	.....	.....
1898.....	74,113	4,027,099	.....	.....
1899.....	219,997	1,454,878	.....	.....
1900.....	.....	189,210	69,854	.....
1901 (six months)....	140,448	406,200	.....	933,592
Totals.....	2,684,558	6,116,587	69,854	933,592

Finished Products B. & C. Department.

	Gross tons.		Gross tons.
1887.....	9,682	1894.....	31,024
1888.....	13,898	1895.....	43,913
1889.....	21,090	1896.....	43,910
1890.....	26,765	1897.....	59,923
1891.....	29,065	1898.....	66,889
1892.....	31,791	1899.....	64,010
1893.....	42,733	1900.....	71,115

There was an incident occurred at Pencoyd which is deserving of mention in the annals of its history—that is, that in the summer of 1863 the employees of the works were drilled every afternoon by Algeron Roberts on the

site which is now occupied by the 12-inch and 20-inch mills. A number of these men enlisted in the service of the State, the firm paying the men a bounty and monthly pay equivalent, in addition to the sum paid by the State, the firm also caring for their families during their absence in the army.

Shipments of Finished Products from Pencoyd Iron Works, Rolling Mill Department.

	Gross tons.		Gross tons.
1853.....	303.4	1877.....	8,612.3
1854.....	276.8	1878.....	12,305.0
1855.....	669.5	1879.....	15,781.4
1856.....	1,505.8	1880.....	15,109.9
1857.....	1,628.1	1881.....	19,229.9
1858.....	1,071.1	1882.....	20,019.1
1859.....	1,255.9	1883.....	19,098.6
1860.....	1,474.2	1884.....	18,046.2
1861.....	1,005.4	1885.....	18,162.1
1862.....	2,063.6	1886.....	25,084.2
1863.....	3,171.9	1887.....	33,081.3
1864.....	3,422.9	1888.....	35,132.5
1865.....	3,169.5	1889.....	42,065.2
1866.....	4,273.9	1890.....	48,230.4
1867.....	3,720.6	1891.....	40,417
1868.....	5,230.6	1892.....	55,459
1869.....	6,305.5	1893.....	52,540
1870.....	6,699.7	1894.....	41,204
1871.....	7,377.2	1895.....	71,569
1872.....	8,151.3	1896.....	78,818
1873.....	6,721.5	1897.....	95,323
1874.....	5,614.2	1898.....	129,917
1875.....	7,938.2	1899.....	157,551
1876.....	6,056.2	1900.....	155,172

The Heat Treatment of Steel.*

BY M. E. VANDERHEYM.

In 1891 the Paris-Lyon-Mediterranée Railway Company determined to replace their iron axles and tires by steel ones, and, from the beginning, they specified under the advice of their Testing Bureau that these articles should be subjected to a treatment which consisted in heating them to bright cherry red and immediately cooling them suddenly in the air. Experiments had demonstrated the superiority of this mode of annealing over the old process of slow cooling in the furnace. The following test had made this superiority evident in a very precise manner:

Five test bars, A, B, C, D, E, were cut cold out of a medium hard steel axle, their finished dimensions being 75 x 24 x 9 mm. (approximating 3 x 15-16 x 3/8 inch). They were nicked across the flat side 1 mm. deep, and one end of the bar was gripped in a vise jaw, leaving 51 mm. (2 inches) free. A weight of 10 kilos (22 pounds) was made to fall 250 mm. (10 inches) on the extremity of the free end.

The results were as follows:

Mode of treatment.	Number of blows to break the bar.
A—Not annealed, natural state.....	3
B—Heated to cherry red, taken out of furnace and cooled in the air.....	10
C—Heated to cherry red, taken out of furnace when the temperature had fallen to 200 degrees C. (392 degrees F.), and cooled in the air.....	8
D—Same treatment, but cooled in lime.....	8
E—Annealed to cherry red with slow cooling in furnace.	3

Some further and more complete experiments were made on bars drawn out under the hammer in portions of steel axles from various sources. They were marked E, F, G, H. One of the bars of each series was allowed to remain in its natural state. The second was annealed *à la volée*†—that is to say, with sudden cooling in free air. The third was annealed and cooled down slowly in the furnace.

In each of the bars thus treated test pieces were cut out cold as follows:

1. A piece 20 mm. (25-32 inch) in diameter for tensile tests.
2. A piece 20 mm. square for rigidity tests.
3. A piece 20 mm. square to be nicked and tested for brittleness.

The elastic limit was measured by means of Neel & Clermont's elasticimeter. Brittleness was ascertained by the method devised by M. Barba, chief engineer of the

* Engineer of tests for the Paris-Lyon-Mediterranée Railway Company.

† "A la volée," literally "on the wing," because the articles after being withdrawn from the furnace are brandished in the air. It seems that a moderate blast would accomplish the same object and could be applied to more bulky articles.

Creusot Works,* with the following modifications: Instead of nicking the piece with a chisel, an operation which is likely to modify the texture of the metal to a depth varying according to its nature, a triangular cutter of chrome steel was used. Moreover, as it is very hard to nick the four faces of a square on a shaper so that the nicks will exactly meet, the rectilinear incisions were replaced by a circular cut made in a lathe, thus leaving a full section of constant surface.

The Barba method was adopted in preference to the usual mode of testing where the bars rest on bearings at each end, because very precise experiments have demonstrated that the latter method causes a considerable rise of temperature in the bar, which affects the results. The brittleness test with both ends bearing has also this very serious objection that a notable portion of the *vis viva* of the weight is spent in bending the bar, and as this is variable and dependent upon the hardness of the metal, the results are not comparable from the single standpoint of brittleness proper. In the Barba method, where brittleness is measured by the fall of the drop which causes the breaking of the nicked portion, this objection obtains in a very much smaller degree.

The accompanying tables which sum up the results obtained in these various experiments clearly bring out the advantages of annealing and sudden cooling in air over annealing and slow cooling in the furnace.

In the tables the letter A applies to metal in its natural state, the letter B to metal annealed and suddenly cooled in air, and the letter C to metal annealed and slowly cooled in the furnace.

Tensile Tests.

Test pieces 20 mm. (25-32 inch) in diameter.

Treat-ment.	Elastic limit. Pounds per sq. inch.	Breaking strain. Pounds per sq. inch.	Elongation. Per cent.	Con-traction. Per cent.
E { A	31,862	63,867	26	54.9
{ B	34,707	65,474	26.6	55.5
{ C	27,310	60,311	25.9	52.8
F { A	31,862	63,156	21.75	58.2
{ B	33,000	65,289	27.75	55.5
{ C	28,448	57,173	27.5	58.8
G { A	31,862	66,285	19.75	58.2
{ B	34,138	69,272	25.25	56.2
{ C	30,724	63,298	24.5	52.8
H { A	31,862	65,474	26.0	55.5
{ B	31,862	65,007	24.5	56.2
{ C	27,310	60,311	26.5	58.8

It will be seen that both as to elastic limit and breaking strain, annealing and sudden cooling shows a marked superiority, while elongation is about the same for the two methods employed.

Rigidity Tests.

Weight of drop, 25 kilos (55 pounds); distance between bearings, 160 mm. (6 5/16 inches); section of test pieces, 20 x 20 mm. (25-32 inch square).

Mode of treatment.	Angle of bend after one blow. Degrees.
E { A	75.5
{ B	68.0
{ C	71.5
F { A	71.0
{ B	68.0
{ C	72.0
G { A	64.0
{ B	64.0
{ C	69.0
H { A	68.0
{ B	68.0
{ C	71.0

Here again we see that from the standpoint of deformation under blows, annealing followed by sudden cooling has the advantage over annealing and slow cooling.

Drop Tests on Nicked Bars. Barba Method.

Weight of drop, 25 kilos (55 pounds); projecting end of bar, 25 mm. (1 inch).

Mode of treatment.	Minimum fall of drop to cause breaking. Inches.
E { A	17 5/16
{ B	15 1/8
{ C	7 7/8
F { A	11 13/16
{ B	17 1/8
{ C	3 15/16
G { A	15 1/8
{ B	21 11/16
{ C	9 13/16
H { A	11 13/16
{ B	15 1/8
{ C	6

* The Barba method consists in nicking a square piece all around with a chisel, then placing one end in a vise jaw. A weight is then dropped on the projecting end, brittleness being measured by the number of blows necessary to break the piece at the nicked place.

In these experiments still more than in the preceding ones the superiority of annealing and sudden cooling can be recognized. These results have a real importance, for in railroad practice the material which the rolling stock is composed of is continually subjected to trepidations and blows, and a high resistance against this class of strains is a precious quality.

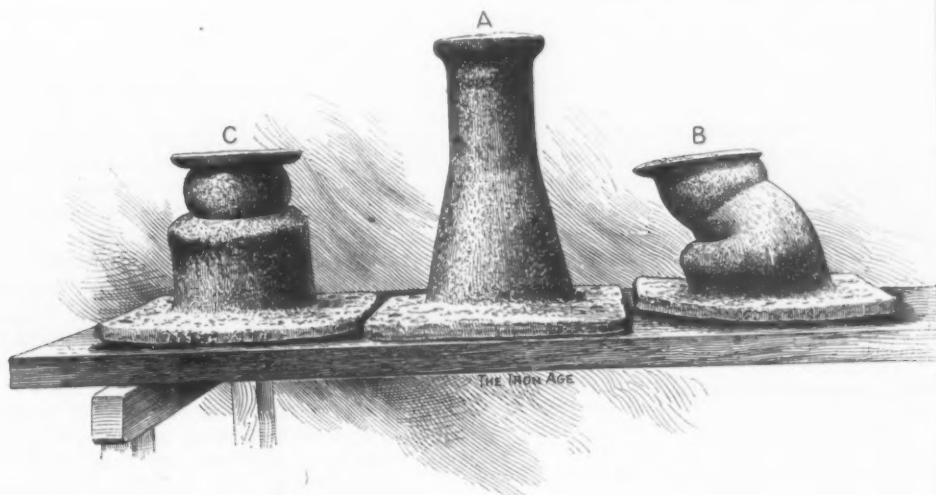
M. Godron, Inspector-General of Naval Engineering, has presented to the Commission for Testing Materials a paper by M. Auscher, Engineer of Naval Construction, wherein the advantages due to quenching soft and medium hard steels are brought out. The results cited in the paper are, as well as ours, in complete accord with the Tschernoff theory. They would lead to the adoption of quenching in preference to annealing and sudden cooling because the improvements in the resisting qualities of the metal are more marked. Nevertheless, the Paris-Lyon-Méditerranée Railway Company have preferred annealing and sudden cooling because quenching, being more brutal, causes strains which may result in cracks if they develop in regions where lack of homogeneity exists, or where there are abrupt differences of thickness. The break in the piston rod of the "Bruix" is an example in point.

Following the same idea, the Paris-Lyon-Méditerranée Railway Company have forbidden annealing and sudden cooling for all pieces which by reason of their form

(Extract from a paper on "Steel Castings" by A. Tissot.)

We shall have closed our description of manufacturing operations when we have indicated an important improvement lately introduced, which brings annealing to perfection.

It is well known that annealing is advantageous in all cases, even with soft metal obtained in basic open hearth furnaces or side blown converters, but it is indispensable with the rather hard material from acid furnaces. Until lately it was practiced in the ordinary way, returning to the metal in this manner a great part of its elasticity by suppressing the molecular strains caused by shrinking, but it brought about only a partial improvement in the grain of unforged metal, where the distribution of the cement and the diffusion of the carbon necessarily remained irregular and incomplete. In this instance again the fine theories of Tschernoff, Osmond and Werth were to lead to a remarkable progress. These experimenters had explained why a simple annealing at practical temperatures, unless it be prolonged beyond measure, could give, without quenching, but an incomplete result. Tschernoff had shown that by fixing the amorphous state of the grain above his point *b* it remained fine and homogeneous. The idea occurred then of subjecting the pieces in the course of being annealed to a cooling, a sort of quenching in the air, stopping at a point where this cooling might again bring about unde-



TESTS OF CAST STEEL BUMPERS ANNEALED AND SUDDENLY COOLED.

are apt to become subject to internal strains when the temperature decreases, as, for instance, in steel castings where thick parts are united by thinner webs and ribs likely to cool more rapidly. The specifications for such pieces require that they shall be heated to bright cherry red, and that the furnace shall then be cooled as rapidly as possible to dark red temperature. The pieces are then allowed to cool down in the furnace. This allows the strains to become equalized by producing their effect upon a metal which is yet hot and sufficiently plastic.

The demonstrated advantages of annealing and rapid cooling have made possible the production of steel castings possessing great resistance against shocks. Steel castings, to a greater extent than forged steel, gain by annealing and sudden cooling, because, being cast at a higher temperature, they cool down quietly, thus favoring the formation of crystals. Before annealing, the structure is foliated and coarse, making the piece unable to resist shocks. It may truly be said that without annealing and sudden cooling, which completely transform the texture, steel castings would but partly possess the qualities which are expected in them for practical use.

We have appended to this note a photographic reproduction of cast steel bumpers which have been treated by annealing and sudden cooling and then tested under the drop. They conclusively show the degree of malleability and resistance to blows that steel castings acquire by this mode of treatment.*

sirable internal strains. This experiment has produced remarkable results. By heating steel to about 1000 degrees C. (1832 degrees F.) and cooling it suddenly in the air down to about 600 degrees C. (1112 degrees F.) it has been possible to improve its qualities in a notable proportion. The tensile strength is slightly raised, but the toughness or resistance to blows is considerably amplified, whatever the nature of the steel may be, hard, medium hard or soft. The effect of this operation is as noticeable in the finished entire castings as in the test pieces and the conditions of resistance to blows, to crushing and shearing are rendered much more favorable by the increase of tenacity of the metal thus treated. It is chiefly to be seen in drop tests made on railway wheels, bumpers, &c., and in hammer and bending tests. Air quenched metal is much more elastic than when annealed in the old way, and it stands much rougher usage without cracking or breaking.

Rumors are current of an amalgamation of the Dominion Coal Company and of the Dominion Iron & Steel Company, both of whom are now controlled by Canadian capital, the Boston interests having sold out. The capitalization of the two companies is now divided as follows: Dominion Iron & Steel, \$15,000,000 common stock, \$5,000,000 cumulative preferred stock and \$8,000,000 5 per cent. first mortgage bonds; Dominion Coal Company, \$15,000,000 common stock, \$3,000,000 8 per cent. preferred and \$2,794,500 first mortgage 6 per cent. bonds.

* A, original bumper; B and C, bumpers after the drop test.

Notes from Mexico.

Mexico's Finances.

DURANGO, MEXICO, January 20, 1902.—For a country which only a few years ago possessed no credit to speak of, the financial showing recently made by the Secretary of the Treasury is of a most encouraging character, and one which strikingly shows the honesty and ability of those who have guided the nation's progress. Without following too closely the exhibit made by the Minister, it will serve the purpose to say that the fiscal year 1900-1901 shows a balance in the national treasury of some \$31,000,000, Mexican. The national credit has been re-established, Mexican securities now being eagerly sought in the world's money markets. The treasury surplus above mentioned has been obtained—earned is the better word—by a wise system of financiering, the credit of its inception and continuance with such satisfactory results belonging altogether to the able Minister of Hacienda. This respectable surplus began to accumulate in 1895-96, which year showed \$5,451,347 to the nation's credit. In the following six years the amount reached \$26,036,024. The addition of guarantee deposits in German banks make up the total. Considering the heavy load imposed upon the treasury by the depreciation of the peso, and the fact that the interest on the public debt has to be paid in gold, Mexico's position at the opening of the year 1902 ought to be a striking object lesson, illustrative of what can be accomplished by capable statesmen inspired by true patriotism. The public debt at the close of the last fiscal year was \$113,910,620, figured on a gold basis.

Increase of Exports.

The Secretary in presenting his estimates for the coming year to Congress, disclosed the fact that there was a gratifying increase in the volume of exports during the three years prior to 1900-1901, and a marked falling off in the latter year, principally in vegetable products.

For the fiscal year 1902-1903, the Secretary estimates the revenues at \$64,823,400 and the disbursements at \$64,738,815.83, leaving a surplus of \$84,584.17.

Petroleum Exploration.

Explorations for petroleum continue in various parts of the Republic. The attention of the oil hunters is at the present time concentrated upon lands in the neighborhood of Lake Texcoco, in the Valley of Mexico. Speculation in real estate where indications of oil have been found has been very active of late in the City of Mexico. Experts declare that the region will prove to be oil productive and that the area within which oil will be found largely exceeds the Beaumont, Texas, field in extent. Drilling and prospecting for oil continue in the Atlantic Coast States. Five hundred tons of machinery consigned to companies engaged in oil explorations were recently received at Vera Cruz.

Agricultural Implements from Europe.

As evidence that much is yet to be done in the way of advertising the superiority of United States manufactured tools and machinery, it may be sufficient to note that among recent imports at the port of Vera Cruz was a large shipment of machinery and agricultural implements from Europe. Manufacturers of the United States should not rest satisfied with the efforts made to dispose of their products, particularly when they are in the line of agricultural implements and machines, by local agents; they should send energetic, practical men to the country; men who are able to go into the fields and demonstrated by actual use the points of superiority possessed by their machines. If this work were intelligently and thoroughly done, in a very little while the native ranchero would have "no use" for antiquated European tools and machinery. Where the patent threshing machine is still the patient mule, of course, the foreign manufacturer is able to offer something better; but it remains for the makers of farming implements in the United States to educate the Mexican farmers, and to demonstrate to them the recognized fact that their plows, reapers, threshing machines, &c., are superior to any others in the world. When this has been

done importations of the class above referred to will cease.

Bids for Water System.

The Ayuntamiento of Orizaba, Vera Cruz, invites bids for the conveyance and distribution of water to the inhabitants of that town. The proposed service comprises a rubble work masonry canal to provide for a minimum consumption of 130 liters per second, and the construction of storage tanks with a capacity of 1000 c. m. each, the same to be made in excavation. Proposals for the work are invited from foreign contractors. Full particulars may be obtained by addressing Señor M. Lascano, Secretary, Orizaba, V. C. J. J. D.

Pig Iron and Coal in Scotland.

GLASGOW, January 10, 1902.—Great as was the activity in the shipbuilding industry of Scotland last year the consumption of iron and steel was not so large as might have been expected, for there was comparative lethargy in some other branches of industry during a portion of the year. Still an output of 554,406 tons of new ships naturally required more material than did the output of 534,759 tons in 1900. What then was the consumption of pig iron in Scotland? This I propose shortly to show.

The Consumption of Pig Iron.

In the first place, then, there were in blast during the year an average of about 81 furnaces, each producing on an average 256 tons of pig iron per week. These are small furnaces, of course, compared with the American type, but they are adapted to the Scotch process of smelting with splint coal, not with coke. The weekly average was 286 tons in 1897, and has gone down since, owing to the larger quantity of low grade ore that has now to be put through. The total output for the year was 1,113,980 tons, or 39,906 tons less than in 1900. Of this 118,090 tons were exported to foreign countries and 159,357 tons to England, in all 277,447 tons, as compared with 331,499 tons in the previous year. This marks a decrease of 54,052 tons in the external demand, of which 39,727 tons was in the case of foreign countries. The consumption in Scotland was 835,932 tons, of which 160,159 tons was in foundries and 675,773 tons in malleable iron and steel works. This total compares with 964,791 tons in 1900, an apparent decrease in the Scotch consumption of 128,859 tons, to which I shall presently refer. The total deliveries for home consumption and shipment were thus 1,113,379 tons (or 182,911 tons less than in 1900), and left 611 tons to be added to stock. The position, therefore, works out as under:

Scotch Pig Iron, 1901.

	Tons.
Stock at December 31, 1900.....	134,646
Production in 1901.....	1,113,980
Total.....	1,248,626
Less total deliveries, 1901.....	1,113,379

Stock at December 31, 1901..... 135,257

Of the stock, 58,329 tons was in the public warrant stores and 76,933 tons in makers' yards. In the one case there is a decrease of 12,962 tons, and in the other an increase of 13,573 tons, on the year. The exports of the year thus compare with 1900:

Exported to—	1901. Tons.	1900. Tons.
France	1,490	9,661
Germany and Austria.....	9,865	56,722
Belgium, Denmark, Norway and Sweden.....	2,785	12,080
Russia	1,809	1,367
Spain and Portugal.....	4,343	5,122
Italy	10,900	14,433
United States.....	2,905	14,142
British North America.....	4,480	9,280
Australia, India and the Far East....	28,942	35,010

It will be seen that the greater portion of the decrease is due to the lessened demands of Germany, which was our largest customer in 1900. In 1901 Italy was our largest foreign buyer. It will be noted that last year we sent only 4480 tons to Canada, as against 9280 tons in 1900, and to some it may seem odd that we should send any at all to Canada, when so much is now being produced there. But there are different kinds of pig iron, and we both give to and receive from Canada and the

United States. Now it will be of interest to compare the above exports of Scotch pig iron with those of the whole country.

United Kingdom Exports of Pig Iron.

To—	1901. Tons.	1900. Tons.
Russia	12,635	21,269
Sweden	40,725	50,960
Norway	17,088	16,726
Denmark	21,971	22,381
Germany	204,861	459,900
Holland	126,851	382,746
Belgium	55,893	131,273
France	71,907	128,431
Portugal and Azores.....	9,372	6,461
Italy	106,386	108,994
Japan	28,806	8,868
United States.....	44,283	45,002
Australia and New Zealand.....	32,602	32,244
Canada	9,158	10,204
Other countries.....	56,085	50,052
Totals	839,223	1,427,525

Note the tremendous drop in the shipments to Germany, which include practically all those debited to Holland and the greater portion of those debited to Belgium, being merely sent through the ports of these countries.

A casual glance at the above figures will give the impression that the Scotch iron and steel making industries were in a much less active condition last year than in 1900. As a matter of fact, shipbuilders and engineers were as busy as they could be all the year, and for only a portion of the year did iron and steel masters experience anything like a scarcity of orders. They do not work on Scotch pig iron alone, but draw habitually on Cleveland for foundry iron and on Cumberland for steel making iron. Now it so happened that last year there was an abnormally wide difference in price between Scotch and Cleveland iron. The normal difference is about 5 to 6 shillings per ton, that is to say, Scotch iron is usually about 5 to 6 shillings per ton dearer than Cleveland, and this difference is just about enough to pay the cost of transport from the Yorkshire furnaces to the Scotch consuming centers. But last year, partly owing to the great falling off in the foreign (especially German) demand for Cleveland iron, the production was more than the market could absorb (though materially reduced), and so the price ruled, while the price of Scotch iron was sustained by the warrants having practically all fallen into the hands of a London syndicate, who held for a rise, but who were compelled to "part" at a loss before the close of the year. From these two causes the difference between Cleveland and Scotch iron ranged from 8 to 13 shillings or so per ton during the year, and as a consequence of that the shipments to Scotland were stimulated. For the year they amounted to 456,000 tons, as compared with 278,000 tons in 1900. There was less hematite iron imported from Cumberland last year than in 1900, partly because the Scotch smelters were making more hematite and less ordinary iron, but there was a new feature in the importations from Cape Breton, Nova Scotia. These in the aggregate amounted to 53,000 tons, of foundry quality, all going direct into consumption. The net result, then, is this:

Consumption of Pig Iron in Scotland.

	1901. Tons.	1900. Tons.
Scotch iron.....	835,932	964,791
Cumberland iron.....	114,000	169,000
Cleveland iron.....	456,000	278,000
Canadian iron.....	53,000	.....
Totals	1,458,932	1,411,791

There was, therefore, last year a net increase of 47,141 tons in the Scotch consumption. It was even larger, for there were two or three parcels of German iron brought in which do not figure in these returns. I calculate that the consumption of the Scotch steel works last year was about 1,000,000 tons. Yet they did not begin general operations until February, being under an agreement among themselves to continue the New Year holidays for a month, with a view to getting down coal prices by allowing supplies to accumulate at the pits.

Prices.

With regard to the prices of pig iron, it is noteworthy that the top figure was reached at the beginning and the

bottom figure at the end of the year. This does not, however, mean that the decline was continuous during the year, for there was a good deal of sliding up and down until the "corner" collapsed in the second half of December. Then the price dropped straight from 56 to 48 shillings 9 pence.

The following are some interesting illustrative figures:

Scotch Pig Iron.

	1901.	1900.
Average price of warrants.....	53s. 9½d.	60s. 4 d.
Highest price of warrants.....	58s. 6 d.	77s. 10½d.
Lowest price of warrants.....	48s. 9 d.	50s. 8 d.
Furnaces existing.....	104	104
Furnaces in blast.....	81	83
Stocks at December 31, tons.....	135,257	134,257
Tonnage of vessels launched.....	554,406	534,759

Scotch smelters have not been well circumstanced in the matter of costs during the year. They have got wages down a bit, but have been paying dear both for imported ore and for coal. Their complaint just now is that since the collapse last month the price of warrants is below the cost of production.

The Coal Trade.

What was the actual output of coal in Scotland last year is not known, but as the miners were working steadily and there were no serious labor disputes, it is probable that the total was fully up to that of 1900—viz., 33,000,000 tons. Prices of shipping coal have declined about 25 per cent. since the beginning of 1901, but splint coal for the blast furnaces has not declined proportionately. In point of fact smelters are only paying a shilling or two less for their fuel than they were paying when iron was 10 shillings higher.

Yet the shipments of coal from Scotland were 1,000,000 tons less in 1901 than in 1900, so that, output being equal, there has been the additional quantity to dispose of at home. At one time the decrease promised to be much larger, but toward the close of the year there was quite a rush to get away cargoes, suggestive, indeed of anticipated contract deliveries in order to obtain the benefit of the rebate of the export duty, which benefit expired December 31. This export duty has borne, and will bear, more severely upon Scotland than upon the rest of the country, because of the large quantity of low priced coal shipped at the Scotch ports to markets where it comes into competition with foreign coal. The total exports to foreign countries last year from Scotland were 6,193,494 tons, as against 7,376,942 tons in 1900, so that the industrial depression on the Continent and the export tax have affected our trade to the extent of 1,183,448 tons, in spite of the unprecedentedly low range of freights.

B. T.

The Republic Works Make Large Yields.—The Republic Iron & Steel Company are doing good work at their various blast furnaces. Hazelton Furnace turned out 392 tons of pig iron on the 22d inst., which surpasses any previous record made by the same stack. Its highest record heretofore was 330 tons. The Hannah Furnace on the 18th inst. produced 357 tons, which is likewise its largest yield. This furnace has averaged about 304 tons this month. The Hall Furnace on the 5th inst. made 150 tons, which is also its highest output. The good record made by all these furnaces has been done on West Virginia coke, which makes the performance more remarkable. A still better showing could have been made if the company had been able to secure their usual supply of Connellsville coke. The Atlantic Furnace is being improved by the erection of two new blowing engines. The new Pioneer stack will be blown in about March 1 and will add considerably to the output of iron in Alabama. Excellent work is being done by their Bessemer steel works. On the 13th inst. these works turned out 779 tons of ingots and 723 tons of billets, both being records for this plant. The estimated capacity of the works had been 600 tons of billets.

M. Paul de Sincay, the general manager of the Vieille Montagne Company, is quoted to the effect that a syndicate of the French, Belgian, English and Eastern German works has been established, and that now the Silesian works are also in the pool.

Notes from Great Britain.

Concerning Ore.

In the issue of December 26 I drew attention to some articles which have recently appeared in the *Statist*, in which it was alleged that there is a growing shortage of iron ore on this side of the Atlantic, and particularly in Spain. It was there stated that there cannot be more than 15,000,000 tons of ore existing in the Bilbao mines. I added: "This is strongly disputed, but I imagine it is near the truth." My reason for adding that sentence was that the opinions of experts as expressed during the past 12 months on this point are fairly unanimous. I have now received a letter from a correspondent, who writes: "In your recent article you drifted into a discussion upon the iron ore situation in Spain, and referred to the now somewhat ancient estimate on the basis of which only 15,000,000 tons of Bilbao iron ore is now supposed to be still in the ground. You said you imagined this to be nearly correct. If there is one thing more than another in our business on which the dicta of experts are unreliable, it is the amount of iron ore still in the bosom of the earth in any particular locality. The pessimists among mining experts are just as fallible as the optimists, of which latter it is said: Positive, liar; comparative, liar; superlative, mining engineer. The five separate ranges of the great Lake Superior region were discovered successively in the face of 'impossibles' from the knowing. The last and greatest, the Mesaba range, was turned up by obstinate green-horns against the 'no' of geologists. You cannot prove a negative, and you cannot see into the earth. I venture to predict that five years will see the unearthing in Spain of iron ore deposits greater than were ever before dreamed of there." My correspondent may be right, and his opinion is certainly worth having. In this connection two announcements regarding a discovery of ore in England are apropos. The first is to the effect that the Millom & Askam Iron Company have discovered four new beds and are now engaged in sinking shafts to reach it. In one case a pocket has been pierced through 35 feet of ore, and the explorers have not yet reached the bottom of the deposit. The same company have very good prospects of iron ore in West Cumberland. They own the Ulbank royalty, near Egremont, and there are indications that the same deposit of iron ore will be reached as that which is being successfully worked in the neighboring mine of Ullicoats. The latter is as yet the most prosperous and most productive mine in West Cumberland. The second announcement is that Kennedy Bros. have made an important discovery of hematite iron ore in the Furness district, on the shores of the Duddon Estuary, near Barrow. At a depth of 90 feet a valuable deposit of rich ore has been pierced to the depth of 60 feet, and the bottom has not yet been reached. The quality is said to be of the best, and gives indications that a large body of metal underlies the Duddon Estuary. While I am on this subject, it might be well to draw attention to a paper read recently by J. D. Kendall before the Institution of Mining and Metallurgy upon the subject of ore in sight. There are a great many valuable and practical hints in this paper which mining engineers should make themselves acquainted with.

Metals from America.

I append herewith a statement giving the registered quantities of pig iron, iron bar, angles, bolts and rods, unwrought steel and steel rails imported into each port of the United Kingdom from the United States during the month of December in the years 1900 and 1901:

Pig Iron.		
	1900.	1901.
	Tons.	Tons.
London	100	185
Liverpool	7,335	495
Manchester	3,505	2,063
Cardiff	107	...
Hull	1,249	...
Glasgow	1,857	252
	14,153	2,905

Iron Bar, Angle, Bolt and Rod.

London	44	...
Liverpool	527	1
Hull	36	14
Manchester	26	...
Glasgow	351	...
Leith	93	...
	1,077	15

Deduct, to correct previous statements: Glasgow.....	463	...
	614	15

Unwrought Steel.

London	200	3
Liverpool	7,991	21
Bristol	1,032	...
Hull	2	...
Manchester	3,141	96
Newcastle	297	...
Newport	4,490	...
South Shields.....	1,017	...
Swansea	4,575	...
Glasgow	6,135	433
Leith	8	...
Belfast	169	...
	29,057	553

Deduct to correct previous statement: London.....	...	9
	29,057	544

Steel Rails.

London	76	...
Liverpool	1,735	39
Manchester	189	569
Newcastle	18	73
Glasgow	25	36
	2,043	717

Deduct to correct previous statements: London.....	35	...
	2,008	717

These figures show conclusively that as yet the invasion of American heavy metal products has not arrived.

Some Open Contracts.

From a great number of open contracts I select the following:

Metal Superstructure.—Tenders are invited by the Netherlands Colonial Minister, not later than the 29th inst., for the supply of metal superstructure for 11 railway bridges, 14 ordinary bridges, ironwork for seven customs sheds, for roofing a salt works, and various other metal appliances.

Rolling Stock.—The following are required for the South Indian Railway Company, Limited: Fifty-two carriage under frames with bogies and 55 covered goods bogie wagons, 208 pairs disk wheels and axles, 1272 laminate bearing springs, 52 sets of carriage fittings, comprising wrought iron work, brass work, glass, screws and sundries. Bridge work for Travancore branch—viz., 63 spans, 12 to 40 foot, for native States section; 34 spans, 12 to 60 foot, for British section; stores, comprising hardware, lamps and fencing pales. Unless the London agents of American firms have already attended to these contracts, it is practically too late to secure them, but, in any event, it is not impossible that many American houses may sub-contract their manufactures to the successful tenderers.

German Commissioner's Report.

It is stated that a meeting of the leading iron and steel masters in Germany has been called for an early date in February, to consider the report of the special commissioner who was sent to investigate the condition and growth of the industry in the United States, with particular reference to the steel trust. The meeting will be strictly private.

Low German Prices.

German competition is still severely felt in the British Midlands. Notwithstanding the statement as to the formation of a German syndicate to increase prices, the imported material has got down to £4 8s. per ton for billets for rolling down purposes, delivered onto Midland ironmasters' sidings. The bulk is coming in bars in 15-foot lengths. It may be interesting to note that the carriage alone to the Midland district from Germany amounts to 15 shillings per ton.

The Talbot Process at Frodingham.

The Frodingham Iron & Steel Company in Lincolnshire, who have been working for some time past the open hearth basic steel process, last week commenced working a 100-ton Talbot continuous process furnace. The furnace is a Wellman tilting, fitted with Wellman electric charger. There is an electric crane and the doors are lifted by hydraulic power. The builders are Tannett, Walker & Co. of Leeds, and so far the result is quite satisfactory.

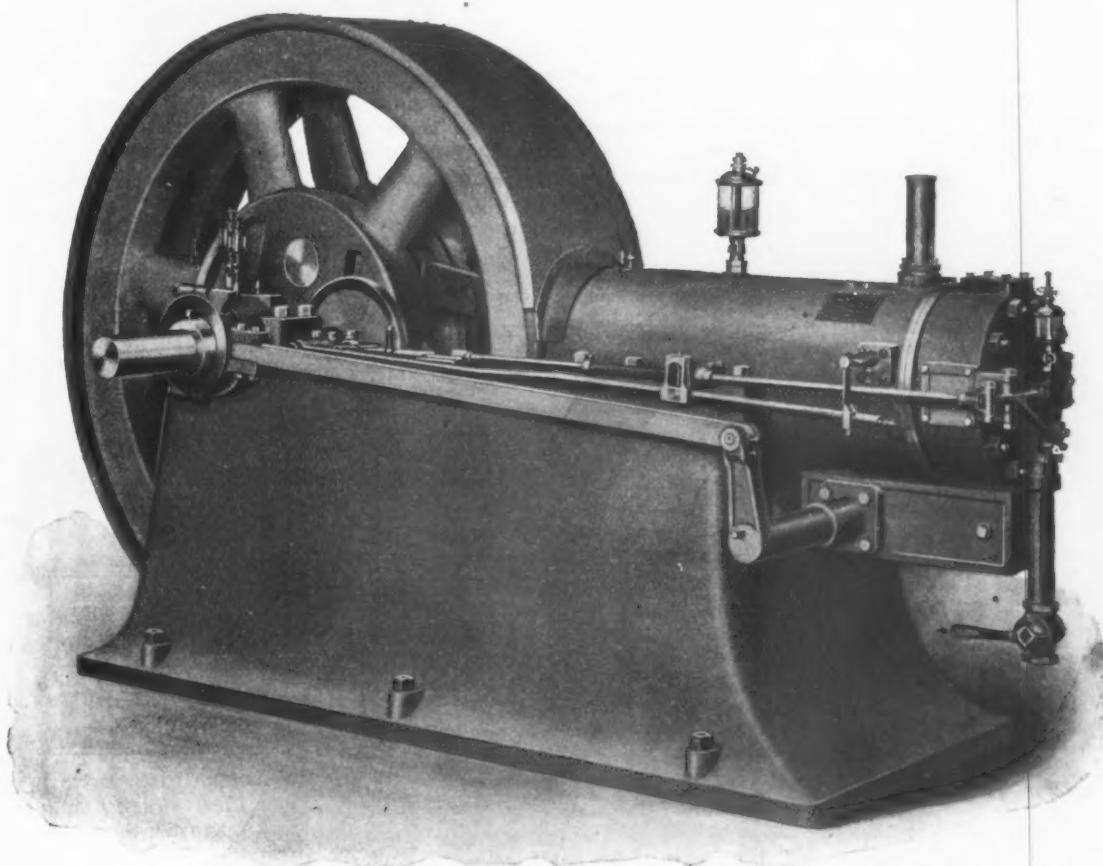
S. G. H.

Sheet Metal Workmen's Wages.—Arrangements have been made which promise to bring about more amicable relations between the sheet metal factories of Chicago and the workmen employed in them. Committees from the Sheet Metal Contractors' Association and the Sheet Metal Workmen's Union met on the 23d inst. and organized a joint arbitration board, to which will be referred all disputes regarding the scale of wages.

The Brighton Gas and Gasoline Engines.

In the Brighton gas and gasoline engines built by the Pierce-Crouch Engine Company of New Brighton, Pa., the frames are of the well-known straight line construction. The entire top portion of the frame, extending from the cylinder, which is bolted to it to the main bearings, consists of two heavy masses of metal, one on each side. The straight line principle is also carried out in the crank and fly wheel construction. The bed is not only ribbed throughout, but has, extending across it, webs and braces which make it absolutely rigid. Under each main bearing is cast a large reservoir for oil, from which chains automatically travel around the shaft, thereby flooding the main bearings; afterward the oil is collected and returned to the reservoirs to be used over again.

The crank shaft and fly wheels are of distinctive design. Solid disks are cast in the center of the wheels,



THE BRIGHTON GAS AND GASOLINE ENGINE.

hours of labor and apprentices. Johnston McIlroy of the McIlroy Cornice Company was chosen chairman, C. D. Wheeler of the Sheet Metal Workmen's Union secretary and Harry C. Kuisely of the employers' association treasurer. The arbitration board will consist of 11 members, of whom five will be chosen from the employers and five from the workmen. The other member of the board will be chosen from a list of six names, which have been submitted to the board. This eleventh man will be called in to act in case of a tie vote on any proposition on which a majority cannot agree. It also was decided that the recent wage scale agreed upon is to date from January 11. The action taken is very important, as peace is thus assured in a branch of trade which has been much disturbed by labor troubles.

The United Coke & Gas Company have closed a contract with the Sharon Steel Company of Sharon, Pa., for the erection of 212 Schnlewind ovens. The daily capacity of the plant will be: Coal carbonized, 1696 net tons; blast furnace coke produced, 1272 net tons; total gas output, 15,264,000 cubic feet, and surplus gas output, 6,784,000 cubic feet.

and into these are hydraulically pressed, first, the crank pin, which firmly unites the wheels, and then the shafts pressed into the wheel centers make the crank complete. The crank pin and shafts are made of open hearth machinery steel of high carbon, turned and accurately ground. The connecting rod brasses press against the crank pin the entire width between the two fly wheel disks, so that the thrust of the connecting rod is absorbed at once by the heavy fly wheels, thus relieving the main bearings of the good part of the thrust of the piston.

The crank pin is oiled while the engine is in motion through a large straight duct leading from a circular groove in the hub of one of the fly wheels. The groove is fed by a stationary sight feed lubricator placed on one of the main bearing caps. Disappearance of the oil in this lubricator is evidence that the crank pin is receiving oil. In addition to the oiling device mentioned there is placed on the crank end of the connecting rod a grease cup which immediately floods the crank brasses and pin if for any reason they should heat.

All the cylinders and pistons are made of a special mixture of close grained iron of unusual hardness to secure long service without excessive wear. Both the

inner and outer walls of the cylinders are very heavy and joined by numerous small bodies of metal through the water jacket, the object being to retain the strength of both walls to resist the very high pressures within the cylinder. The water jacket surrounds the entire cylinder as well as the cylinder head, and has both inlet and outlet openings of ample size to keep the cylinder always as cool as is consistent to secure the highest economy and efficiency.

The pistons are designed with a system of heat conducting and radiating ribs placed internally, which permits the use of lighter pistons with thinner walls than can ordinarily be used, and still produce a piston of ample strength. The object of the ribs is to keep the temperature of the center of the piston from rising to a point that would result in premature ignition, as well as to strengthen the walls. The pistons are provided with three or more cast iron rings, the joints of which are cut diagonally, and are equally spaced around the circumference of the piston, and held in place by pins. The piston pin is driven through the piston and firmly held in position by set screws fitted with lock nuts on each side of the connecting rod.

The connecting rod is of special design, forged from open hearth steel. Both ends are fitted with phosphor bronze boxes and with the well known strap joints with gib and key adjustment for taking up the wear. All the main bearings, as well as the connecting rod boxes are

cylinder head. Another rod, actuated by a cam on an auxiliary shaft near the main bearing, extends back to a forked lever fulcrumed in a bracket on the cylinder head,

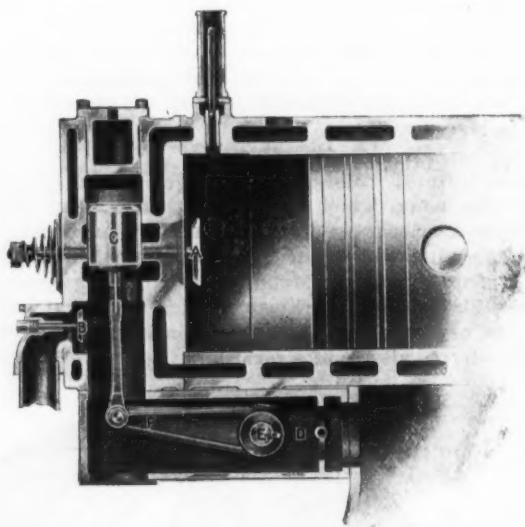


Fig. 3.—Section of Cylinder Head and Air Box, Showing Valves.

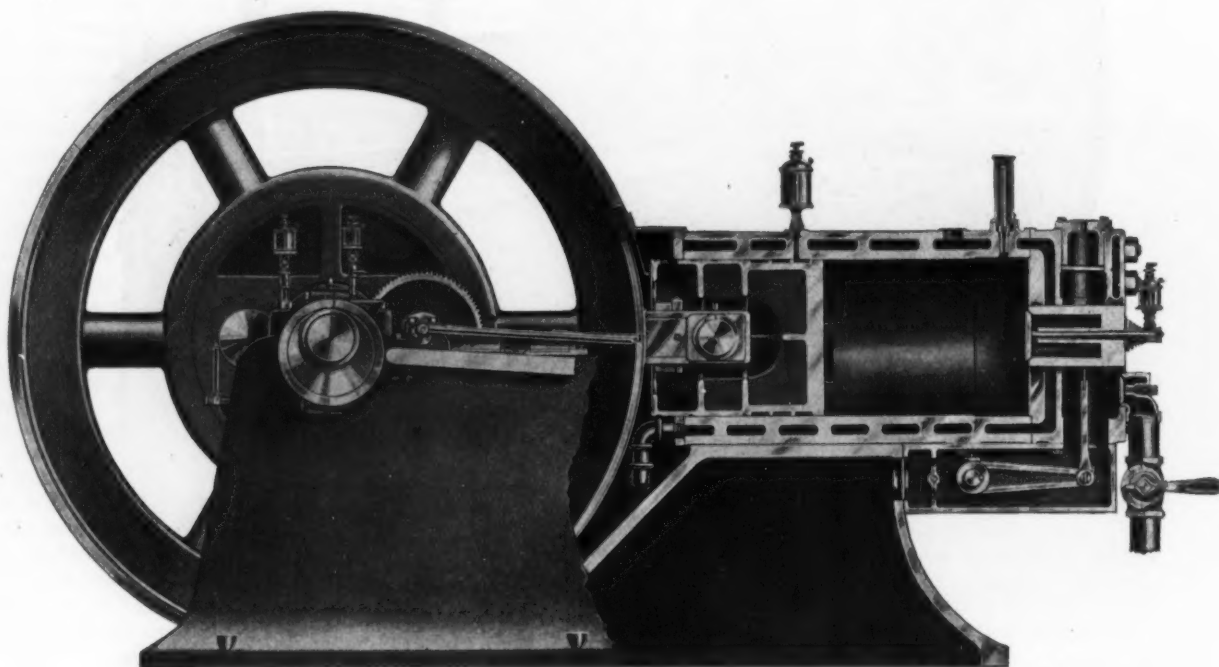


Fig. 2.—Vertical Longitudinal Section.

THE BRIGHTON GAS AND GASOLINE ENGINE.

adjustable for wear, and designed with extra large bearing surfaces. All the bearings are of phosphor bronze.

By referring to the section, Fig. 2, of the cylinder head and air box, all of the valves of this engine may be seen. They are only three in number, two of the poppet and one of the piston type. But one of these valves opens into the cylinder—namely, the main poppet valve A, Fig. 3. The other two, the gas valve B and the piston valve C, are entirely apart from the combustion chamber and are not subjected in any way to the heat of combustion.

Referring again to the sectional cut, D is the air box under the engine cylinder and head through which air for the cylinder passes from the base of the engine. An eccentric on the main shaft actuates a rod extending the length of the engine to a rocker arm, thence through a rock shaft, E, which actuates another rocker arm, F, within the air box. This rocker arm operates the piston valve C vertically in its chamber in the center of the

which opens the two poppet valves; the larger one showing a taper coiled spiral spring to close it, controlling the only opening from the cylinder head to the cylinder; the smaller poppet valve, also opened by the same forked lever and closed by a spiral spring, simply admitting gas at the proper time from the main gas inlet pipe to the piston valve chamber.

The functions of the piston valve are: 1, To direct the ingoing charge of gas and air; and, 2, to direct the outgoing products of combustion into the exhaust pipe or opening, by opening and closing the ports in its chamber at the proper time. By its use one valve is made to perform the duty of two or more valves; at the same time it is positively operated in both directions by a crank motion, thus being free from noise. Its use also dispenses with a number of springs and other delicate parts. Being positively operated, the piston valve produces no negative work on the piston of the engine in having to be forced open by pressure or lifted from its seat by suc-

tion, as is usually the case in the valves used in other engines.

The combination and location of the valves above described, as will be seen by the sectional cut, permit of perfect lubrication by the use of an oil cup on the face of the cylinder head, and as well of cooling all parts in any degree affected by the heat of the cylinder by a perfect system of water jackets completely surrounding the cylinder from end to end and continuing also throughout the cylinder head.

There are two methods of governing now generally adopted in gas engine construction, the "hit or miss" and "throttling." The former is perhaps the better known and more generally used, the principle being that the charge of gas and air admitted to the cylinder is the same amount for each impulse, whatever the load carried on the engine might be, the number of impulses, however, being varied to meet the requirements for power in proportion to the work to be done. The latter principle is to throttle the amount of the charge of gas and air admitted to the cylinder, the number of impulses, however, remaining constant. In both cases the relative proportion of gas and air remain the same under all conditions. It is now admitted by all that while both of the above principles have their good points, yet each one has its advantage over the other when used for particular purposes under certain conditions. The Brighton engines of more than 6 horse-power are equipped with either of

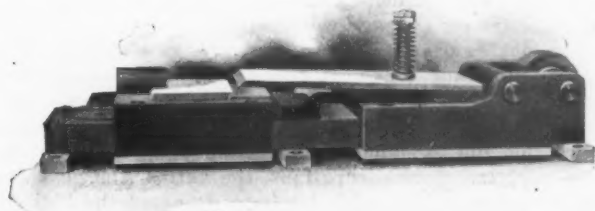


Fig. 4.—Inertia Governor.

gas inlet to the cylinder. The governor is driven by an endless belt from small pulley on main shaft, and the amount of gas and air admitted to the cylinder varies in proportion to the load on the engine.

The ignition of a charge in a gas engine cylinder is accomplished by either of the two methods commonly known as the incandescent tube and electric spark. Believing that both of these methods have advantages, and inasmuch as the matter of ignition is a very important one, these engines of sizes above 6 horse-power are provided with igniters of both methods. Engines of the smaller sizes have incandescent tubes only. On engines equipped with both tube and electric igniters they are so arranged that either may be used independently of the other.

This engine has an automatic starting attachment. This consists of a small storage tank for air, which is compressed by the engine itself, the cylinder being used as a compressor. A double check valve or starting valve is placed on the air line leading to the engine, the line being also provided with a sealing valve. After the valve is properly connected to the cylinder a small quantity of

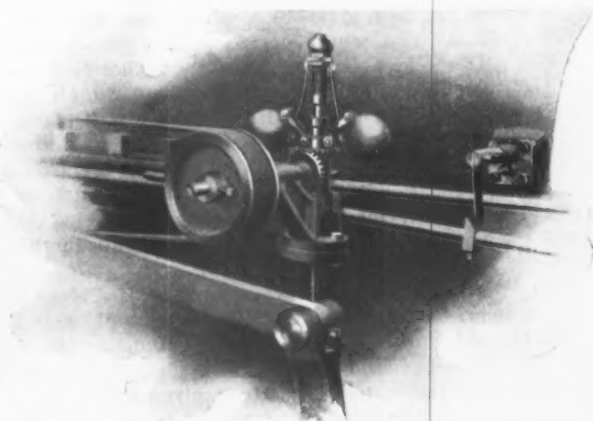


Fig. 5.—Throttling Governor.

THE BRIGHTON GAS AND GASOLINE ENGINE.

these, the smaller sizes being furnished with the hit or miss type only. The company make two types of governors, one a centrifugal shaft governor and the other an inertia governor. Both types are used in connection with the same disengaging valve mechanism. The centrifugal shaft governor consists essentially of a disk, which carries a fulcrumed lever, weight and spring, common to this type of governor as used in steam engines.

The inertia governor, Fig. 4, consists of two inertia points, which are beveled surfaces added to the valve gear, as shown. These, being made of tool steel and hardened, will wear indefinitely. The working surfaces of these points are so shaped as to give an upward motion to the hinged blade of the valve gear. This produces the force in one direction, and the opposing force to return the blade is produced by a spring on the top of the blade. When the blade is moving backward over these inertia points it must leap over an intervening space between the point of the blade and its shoulder or hook. It will thus be seen that as the speed of the engine increases the blade will receive greater inertia and will not return as quickly; also, at the same time the speed of the engine being slightly increased, the blade is moved over the intervening space in less time, thereby producing a double governing effect. It is of course understood that when this blade in the valve gear does not engage with its shoulder or hook, no charge is taken into the cylinder. With this governor the speed of the engine may be changed instantly, as desired, while in operation the range being from the lowest to the highest at which the engine will operate.

The throttling governor, Fig. 5, is of the well-known spring, fly-ball type, which operates two balanced "butterfly" valves, one controlling the air and the other the

gasoline, not over a spoonful, is poured into the small cup of the starting valve, and when a small lock is opened this passes into the air line. The engine fly wheels first being turned over to the starting point, the position of the crank pin being off the dead center, the engine is ready to start. A throw of the starting valve admits a small quantity of air to the cylinder, vaporizing the gasoline in the pipe, forming a combustible mixture which is ignited in the cylinder, thus giving a strong impulse to the piston. The piston on its next stroke draws in a charge of the regular supply of gas, which has already been turned on, and igniting the same, the engine then begins its regular cycle of operations. One starting of the engine reduces the pressure in the air tank only a few pounds; thus, on a full supply and pressure of air, an engine may be started several times. To refill the air tank it is only necessary to shut off the gas supply, open the sealing valve and raise the starting valve handle. The power stored in the heavy fly wheels is sufficient to recharge the air tank to the desired pressure. The engine is then ready for starting again, as already described.

The gasoline engines are practically of the same construction as the gas engines, with the exception of the addition of an attachment consisting of an adjustable mixing valve, which is supplied with gasoline from the supply tank.

A Plate Mill Record.—In one day recently the 128-inch plate mill at the Homestead steel works of the Carnegie Steel Company turned out 1049 tons of sheared plates, as compared with 788 tons, the best previous record in 24 hours.

American Educational Wisdom.

BY STUART UTLEY, SHEFFIELD, ENGLAND.

America's confidence in its future, and its determination to fight for the lion's share of the world's trade, profoundly impressed me when on every hand I realized the splendid educational facilities she offers to the rising generation. In this she is in many respects far ahead of European countries. In America there is no class fear lest the education of the people should weaken entrenched monopoly or give them a dangerous desire for fuller freedom. There is an entire absence of the short-sighted, selfish policy which leads large numbers of rich men, who pride themselves on being, as they term it, "self made," to tighten their purse strings whenever an appeal is made to them for educational purposes. They say with self satisfaction, "I made my position with little education and I don't see any reason why I am called upon to assist." On the contrary I found that American citizens as a rule enthusiastically admit its necessity and do not hesitate to make the greatest possible sacrifices for it. This is in striking contrast with the state of things in England, where a severe and sudden check has been given to secondary education by the Government and where popular education is still regarded with the greatest distrust by the higher classes. The American people have been especially fortunate in the fact that many of her wealthy citizens have given large sums for educational purposes, acting upon the example set by the Scotch wealthy men of the past, who placed education in their country in a position to enable their countrymen for a considerable period to secure the lion's share of the best appointments in the world.

Take, for example, the Lewis Institute of Chicago. The fact that an individual citizen should give \$1,600,000 for technical education is perfectly astounding to a Britisher. We have no parallel to such munificence. Generous Englishmen have, it is true, given handsomely to charities and for public libraries and art galleries, but very little indeed has been done for education, and especially technical education. I am glad to note, however, that owing largely to the public spirit and persistent efforts of a very few of her wealthy citizens my native city, Sheffield, is waking up to her responsibilities, and within the past few months there has been subscribed no less than £28,000 (and the list not by any means exhausted) for the purposes of technical and commercial education.

It is quite true that in the past our ancestors founded schools for the education of the young of their particular communities, but in the great majority of cases these institutions are now monopolized by those whose friends can very well afford to pay for their education. Whatever may be said against the American millionaire, this at least must be admitted, that he has recognized the fact that the success of a country to a very large extent is dependent on the intelligence of its people. Instead of foolishly kicking away the ladder by which he has climbed, he is showing a commendable determination to assist the very poorest to start the battle of life fairly.

There were certain features of the American educational system which roused my admiration. For instance, I saw little or nothing of child labor. The half timer appears to be comparatively unknown, whereas it is a regular institution in Lancashire. In this respect the Americans are wise. They do not take the children from school for half their time when they are 11 or 12 years of age, and thereby spoil their future physically and mentally. Nor do they think that when a youngster has reached the age of 13 it has got all the education it requires. The youngest people I saw working in the States were those employed in large factories, but those were never less than 15 or 16 years old. Another feature which struck me was the readiness with which the Americans adopt anything that is good, from whatever source or country it may emanate; nay, more, they will offer special facilities for their young students to acquire foreign notions on the spot, hence considerable numbers visit Europe annually for this purpose. Then they do not

commit the blunder—nay, I may well describe it as a crime—of making the education of children a religious question and of quarrelling and fighting over it as is done in England—to the great injury of the children and the weakness of the nation.

It is one of the inevitable conditions of an old country that red tape is ever in evidence, curbing thought and fettering action to the manifest injury of the community. This is strikingly shown in education methods in the old world. In England there are too many restrictions on the teacher, and little or no allowance is made for individual idiosyncracies. In America more attention appears to be paid to results than to methods. The teacher is apparently not hampered or restricted, and has not to toe the line to an imaginary standard drawn up by a central authority, who frequently knows no more about local conditions than a bull does of mathematics. The result is that young America is receiving a preparation for the practical and commercial positions second to none and ahead of many. The above remarks apply with especial force to technical education. The American has long realized that if he would capture the world's markets, or even secure his legitimate share of the trade, he must have the best possible education. I was strongly impressed by the fact that young people are much more in earnest in pursuing their education and attend classes for a much longer period than do the youth of the old country; in fact, I saw a large number of students of 23 and 24 years of age—and in some cases even much older—in Chicago, Boston and other cities. In fact, one of the principals informed me that they had been compelled to adopt very stringent measures in order to prevent students obtaining access to the college on Sundays for the purpose of study.

In looking over the list of graduates in several of the more important technical colleges of America I was struck with the great majority of British names. On making inquiries on this point I was informed that while as a rule the foreign element devote their attention to the more laborious occupations, the native American is manifesting an increasing tendency to adopt the higher branches of industry and fit himself for professional and mercantile careers. He is not content to be a machine mender or tolling drudge. His ambition is to create, to control, to direct, to reap the best possible harvest, and for this purpose he lays himself out to secure a sound commercial and technical education. Now, in view of the fact that the majority of these institutions have been founded during the past 30 or 40 years and that their effectiveness is being added to each year, it is obvious that the civilized nations of the world have good reason to fear the competition of educated America.

As a rule in Great Britain a university training is regarded as being all essential to filling the higher ranks of teaching, and if a teacher is required at a higher salary, even in a technical school, the appointment has frequently gone to the university man, although his competitor may be one who has had, in addition to a sound education, a good workshop training. I am aware that there are some notable exceptions. I found in America that many of the teachers in technical colleges who devote their full time to the work at high salaries are thoroughly practical men. Indeed, some of them with whom I conversed were rather proud of having come from the old country and having received their technical training in English workshops. If there is a weakness in technical education in America it is on the side of practical training. I can perhaps best illustrate my meaning by describing the procedure at the technical schools in Sheffield, England. In that center the efforts of the local authorities are chiefly directed to the principal local industry—steel making and engineering. Here perfect workshops have been fitted up in each department, and theory is combined with practice in the most admirable manner. In the section devoted to the steel trade plants for the production of both Siemens and crucible steel are erected, and under the able direction of Professor Arnold the students are taken through a complete course of study from the raw ore to the highly finished tool. In the engineering section the student combines theory with practice in the use of tools

in the workshop, coupled with all the latest instruction in the testing and use of materials, under the direction of Professor Ripper, who is himself a practical engineer. This applies to day students, who are chiefly the sons of manufacturers or other middle class men. The greater number of students attend the evening classes, and are drawn from the workshops where they are engaged in the practical during the day. At the school they are fully instructed in the theory. One other important section is plumbing and house sanitation. Here are to be found quite a number of apprentices supplementing their workshop practice by lessons in theory. It is pretty much the same throughout the United Kingdom. Special provision is made to teach the theory and practice of the principal local industries. Thus at Bradford an exhaustive training in the woolen and dyeing industries is given; at Manchester and other Lancashire towns, cotton; Birmingham, the various hardware trades, and so on.

Now from what I saw of some of the American technical colleges there is a lack of practical training. In other words, the technical education in many of the towns is of general character and does not take enough cognizance of local conditions; hence American citizens do not get that amount of benefit from their expensive technical educational system which in my opinion they have a right to expect. Inasmuch, however, as they are only on the threshold of this class of training, and as they show a wonderful readiness to adapt themselves to changed conditions and are prepared to accept useful hints from any one or anywhere, I believe they will soon throw themselves with as much energy into the practical part of training as they now do into the theoretical.

The above remarks, however, do not apply to the Lewis Institute. Here ample opportunity is afforded for practice in molding and other branches of industry. The equipment in the forging shop, which contained everything requisite for the business, was most complete. A 200-pound steam hammer, 16 ordinary forges, with full sets of tools, drilling machines, shears, testing machines, annealing furnace; in fact, both forge and machine shop are supplied with every requisite for a practical training, and here I feel bound to express my thanks to the principal, G. N. Carmen, for the courtesy manifested toward me on the occasion of my visit to the institute. I was certainly much impressed with all I saw—the staff, the equipment. The general arrangement of the building was such that one could not be surprised that the result is a remarkably well trained body of young men and women, who not only possess a sound knowledge of the theory, but are well up in the practice of the various trades or industries they have adopted. In the near future they will go forth into the ranks of trade and commerce, where they will become intelligent heads of industrial concerns or enterprising agents to push American trade abroad.

I have before me the annual catalogue of the Massachusetts Institute of Technology for 1900 and 1901. It is a bulky volume of 390 pages, and containing a mass of information which would make educational reformers in England open their eyes in admiration. On looking over the register of students I find that there are seven fellows, three of whom reside in Germany, one in Paris and the remainder in Boston. There are six graduate scholars and 89 graduate students, both men and women (for America has long ago got over the sex prejudice). In addition there are 193 fourth-year students, 184 third-year students, 205 second-year students, 340 first-year and 345 special students, or a grand total of 1277. These are not engaged in workshops during the day and accept such small amount of work as may be afforded in the institution. In this, I am of opinion, lies the weakness of the position, for although it indicates the great desire of the native American to secure the best positions in the industrial world, it also shows a disposition to escape the drudgery of the workshop. I dare say that I may be regarded as having old world notions, but I am bound to say that no one can efficiently and satisfactorily fill the position of manufacturer, manager or agent except he is well grounded in workshop practice. He will break down at the very point where he is most required—viz.,

when he is face to face with a manufacturing problem or called upon to interpret a new demand. Contrast this with Sheffield, England. The technical department of the Sheffield University only opened in 1889. It had then a total of 197 students, 159 of whom were evening scholars. For the year 1901-1902 the members are as follows: Eighty-seven day students and 1063 evening students, or a grand total of 1150. The evening students only attend the classes after their day's work is over, and there is little or nothing in the shape of residence, as is the case in so many of the American technical colleges. Still, as already indicated, the English system tends to turn out more highly skilled workmen and thoroughly practical heads of departments. If manufacturers in Sheffield and England generally would arrange to give special facilities and inducements for all the young people learning trades in their workshops to attend regularly a course of, say, four years' training in the evening classes of the various technical schools its effect would be to make Britain's industrial position unsailable.

There was one especial course of procedure wherein America is in advance of Great Britain. That is in excursions to leading works in order to gain experience. I find, for instance, that the summer school of metallurgy of Boston was held in Western New York and Ohio. The leading works of Syracuse, Buffalo, Niagara Falls and Cleveland were visited. Coking and by-products and the mixing of ores for the production of iron, the manufacture of steel and copper wire were studied, as well as certain chemical and electrical processes. The following year the school was held in Nova Scotia, where the mining and milling of gold, the mining and shipping of coal and the manufacture of gas and coke were studied. In 1899 the school was held in New Jersey and Pennsylvania, where copper works, iron, steel and zinc works were visited and processes studied. The methods of smelting were followed through from the ore to the finished metal ready for the market. In 1900 the school spent some weeks in New Jersey and Eastern Pennsylvania, where the mining of iron and anthracite coal were the leading objects of study.

Now I regret to say that we have nothing comparable to these summer schools in England, and the most an enterprising British youth can do is to get well grounded in the theory and practice of manufacture. No systematic or general attempt is made to carry him into the higher ranks of the trade—at least not in the schools.

In some quarters it is, I know, alleged that though the Americans turn out a cheap handy article, there is a lack of durability, and from what I know there is a considerable amount of truth in the allegation. This, however, does not arise from any lack of theoretical education, but from a desire to produce an article which will catch the public eye at the least possible cost, without regard for durability or real utility. There is to my knowledge a demand for a good article, and once the public are assured that it can be obtained from any particular firm that firm will do well. In my opinion, based on a long experience, these inferior productions do infinite injury eventually to the trade of any nation, and this applies to America.

The superior education of the American in trade matters shows itself in another form. Nothing has done more to curb individual enterprise and inventive ability in Great Britain than the clumsy, expensive and restrictive patent laws. In years gone by thousands of clever British workmen have had their talents strangled and their efforts rendered futile by the difficulties and expense incidental to protecting their patents, and although these restrictions have been slackening of late years, matters are not yet as easy as they ought to be. In the United States, however, every facility has been given for workmen to develop their ideas. Thousands of first-class workmen from Great Britain have found that fair play and recognition of their abilities which was denied them at home. The result is that America is to-day *par excellence* the country of inventors.

Speaking generally of the educational system in the States, in my opinion it is one of the finest in the world. Like everything else in America, it is new and bears

the marks of haste. When these minor defects are remedied and a wise regard is shown to combine durability with cheapness, then she will press Great Britain very closely indeed.

I am, of course, not the first writer who has been struck with the intense earnestness of the American people. It has been my privilege to see a good many students at the technical schools in the old country, and one naturally expects to find young people who attend such institutions very much in earnest. In this particular I was strongly impressed with the manifest earnestness and determination of the students attending the schools, colleges and other educational institutions of Chicago, Boston and elsewhere, irrespective of age, class or sex. Everywhere there appeared to be manifested the same spirit of wholeheartedness and high resolve to acquire the greatest possible amount of information, and to use it to the fullest advantage. It was striking enough to find people of mature age in such dead earnest, but when I found it equally manifest in quite young persons of both sexes, and saw the manner in which they became so absorbed in their studies and so thoroughly intent on gaining knowledge as not to allow themselves time for ordinary meals or recreation, I was driven to the conclusion that the youth of Great Britain will have to apply themselves with greater assiduity and earnestness to the study of their trades and professions than has been their habit of late years, and that Great Britain generally will have to waken up and show herself much more in earnest than she has ever been before if she is to retain her position in the industrial world.

Charcoal Briquettes from Wood Waste in Sweden.

The manufacture and carbonization of briquettes, made from waste lumber, is being successfully carried out at the Skonvik Saw Mills, in Sweden. From a report upon the results secured, made by Gustaf von Heldenstam, and abstracted in *The Engineer* of London, the following details are noted:

The wood should be thoroughly dry; though the presence of about 50 per cent. of water in the waste lumber requires the consumption of a large amount of fuel for this drying process as ordinarily carbonized. As the waste from lumber and saw mills varies greatly in form and size, it is found more convenient to reduce it to sawdust. In this sawing process, the lumber is made to pass between rollers which squeeze out much of the moisture. The sawdust to be carbonized passes to a drying apparatus, heated partly by waste steam from the engine and partly by steam direct from the boiler. This drying plant is located on an upper floor; and from it the dry sawdust is led—by a hopper, to the briquette presses below. The briquettes are delivered in a continuous string to the adjoining carbonizing apparatus. This latter consists of a number of upright iron cylinders, provided at the bottom with outflow pipes for the products of distillation, and at the top with a cast iron cover carrying a hydraulic press cylinder.

The process of carbonizing the wood is described as follows: The charge of briquettes is brought by a traveling crane over the mouth of the retort, is lowered into it, and the cover is put in place. Hydraulic pressure is then applied to the cover, forcing it down, and at the same time the fire is kindled in the furnace of the retort. The products of distillation pass through a cooling pipe to a collecting well, whence they are pumped to three reservoirs, and the tar and the wood alcohol are allowed to separate before undergoing further manipulation. When the charge is completely carbonized, the cover is taken off and a sheet iron cylinder is placed over the mouth of the retort; and in this latter the charcoal is raised and carried away upon a car to cool. The plant for this process is made at J. & C. G. Bolinder's Mechanical Works, at Stockholm, under Swedish patents.

A series of tests of the process has been carried out by eminent Swedish engineers, and the report quoted goes into very full detail. Summing up the results, we find that to carbonize the briquettes requires the con-

sumption of about 58 pounds of wood per 220 pounds of briquettes. In apparatus now being made there will be room for 4400 pounds of briquettes in each retort; and with a carbonization of 18 hours per day, for 300 days in the year, the annual product would be 800 metric tons per retort. In the plant described there are eight retorts, with an output of, say, 6000 tons per year. The fuel used in drying the sawdust and heating the apparatus and the boilers is estimated at half the weight of the briquettes, as a maximum; and a plant of the dimensions described would thus annually require 9000 tons of lumber waste.

From the 6000 tons of briquettes are obtained:

	Per cent.	Metric tons.
Charcoal	33.43	2,005.8
Tar	8.34	530.4
Acetate of lime.....	5.00	300.0
Methyl alcohol and acetone.....	.75	45.0

At Swedish prices the receipts from this product amount to 206,772 kroners; and including in the expenses 10 per cent. for a sinking fund on the capital cost of 300,000 kroners, the profits amount to 68,872 kroners; or \$18,251.08, taking the krona as worth 26½ cents in United States currency.

An analysis of the briquettes at the Royal Technical High School shows that the briquette coal is pure charcoal, free from extraneous matter and possessing great solidity and density. A hectoliter of briquette coal, containing 9.4 per cent. of water, weighs 36.3 kg., as compared with 13.8 kg. for ordinary saw mill charcoal with the same amount of moisture. It is also only one-third the bulk of ordinary charcoal. The tar is of a rather thin quality, and contains a considerable quantity of creosote; as it is uniform in quality it is especially useful for antiseptic purposes. Acetate of lime is used in producing acetic acid; and the methyl alcohol is largely employed in the manufacture of aniline colors and for producing the disinfectant, formalin.

The writer sums up his paper by noting the following advantages of the process: 1, A single system for working up the waste material by first putting it into the form of sawdust; 2, the cost of making the sawdust is amply repaid by the simultaneous mechanical drying and reduced labor cost of handling the product; 3, by reducing the wood to the form of briquettes, the apparatus for carbonizing is reduced in volume, as compared with scantling, as 235 kg. is to 1000 kg. per c. m.; 4, the charcoal produced by the process is of great solidity, and the same products result as from dry distillation; 5, there is great economy in space required as compared with the carbonization of scantling, and no danger from fire—as in the latter process.

Carnegie Open Hearth Records.—Some remarkable records for continuous heats in basic open hearth practice have recently been made at the Homestead Steel Works and the Duquesne Steel Works of the Carnegie Steel Company. One furnace before it had to be relined made a run of 368 heats, the second made 476 heats, third 571 heats and December 21, 1901, the last furnace was stopped after having made a run of 611 heats, the total number of heats made by the four furnaces being 2026 heats. It is believed this is the world's record. At the Duquesne Steel Works four similar furnaces made another remarkable run. Furnace No. 51 made a run of 400 heats; furnace No. 52, 342 heats; No. 53, 409 heats; No. 54, 450 heats; a total of 1601 heats for the four furnaces.

The Rolling Mill Company of America.—Active work has been started on the ten-mill sheet plant to be built by the Rolling Mill Company of America at South Connellsville, Pa. It will be recalled that George J. Humbert, who was manager for some years of the Connellsville works of the American Tin Plate Company, is identified with this concern. It is possible that later on a blast furnace and an open hearth steel plant may be built, in order to give the concern their own supply of steel.

Charles H. Morse of Fairbanks, Morse & Co. of Chicago has purchased a controlling interest in the Sheffield Car Company, Three Rivers, Mich., manufacturers of light cars for railway water and industrial purposes.

Iron Mining News.

DULUTH, MINN., January 25, 1902.—Estimates quoted at the lower end of the lakes for the ore production of 1902 are running from 25,000,000 to 27,000,000 gross tons. These, it is almost needless to say, are too high. They are in large part based on individual estimates from mining and shipping concerns, and are for what these concerns think they can separately do. It is very sure that many of them are far too high, and that the aggregate total will be much less than these figures. While as a matter of fact it is not impossible for the mines to produce far more ore than has ever been shipped, it will be hard to get lower lake dock room for more than 10 to 15 per cent. above the receipts of 1901. Upper lake railroad accommodations have never been tested, and it will probably be possible for the roads of Minnesota alone to haul to Lake Superior 13,000,000 gross tons, but it is not likely they will be called upon to do so much. If they are not it is manifestly impossible for the five ranges to get out any 25,000,000 tons.

Selling Mesaba Ore at the Mine.

There has been some selling of ore from the Mesaba range at a price delivered on track at the mine, and this extending over a series of years. Probably if the opportunities for this sort of selling continue into another winter there will be more independent properties on the range, properties that are owned by discoverers who have considered that they would better sell their explorations, but who will change their views if they can make contracts with responsible buyers to take their ore at mine for a term of years at a price that will net them a better profit than the comparatively few cents a ton they can usually sell explored ore bodies for. Some small properties will be opened this winter on this basis, and will add a small total to the year's probable output.

At the Negaunee mine, where such a serious time has been had, they have the water under control and will very shortly reopen the caved drifts where the men are buried. The mine is a very hard one to operate, and has been growing more so for years. The old portion is in pretty bad shape, though it is considered improbable that the shaft will come together. The Donora Mining Company (Union Steel Company), who have been examining the Barasa mine, at Negaunee, have given up their option. The Cambria and Lillie mines, at Negaunee (Republic Iron & Steel Company), have been put on one shift and will work so through the year. They will produce in single shift all the ore required from them by that company's furnaces. Drilling on the Breitung lands is progressing steadily, now that it is starting. The Cleveland Cliffs Company are slow in starting work sinking for their new mine close to the Negaunee, and are likely to perfect their plans a little differently on account of the accident at the former property. Rogers, Brown & Co., pig iron merchants, have purchased the Beaufort mine, and will operate it this year. The Beaufort is a small low grade property.

The Pennsylvania Railroad in the Mining Regions.

It is reported on the upper peninsula that the Pennsylvania Railroad is seeking entrance to the ore fields of the peninsula, and that the Manistique & Northwestern, recently sold, has been bought for it; that it intends to connect the mining region with its Grand Rapids & Indiana by a line to Traverse Bay, and there by car ferries reach the upper side. The purchased line reaches a point but a few miles distant from the southwestern terminal of one of the lines of the Cleveland Cliffs Iron Company. This new is "important, if true." By the Grand Rapids & Indiana the Pennsylvania would have, with this new line, a direct all-rail connection between the Marquette and Menominee ranges and the furnaces of Chicago, Ohio and Pittsburgh. In this connection it is interesting to note that rail shipments of ore are now quite large, especially from the Menominee range.

The Menominee Range.

On the Menominee range the Kimball property, in Crystal Falls City, has been taken by Corrigan, McKinney & Co., and is to be opened on a fairly good scale.

This firm now have in that vicinity the Crystal Falls group of three mines, the Armenia, Dunn and Kimball and the Groveland and Quinnesec. At the old Hope, in Section 27, a mile south of the town, the Oliver Iron Mining Company have met such improved conditions that an important equipment is now under consideration, and it is probable the mine will be a shipper the coming season. At the James exploration in the west end of the county they are cutting high grade Bessemer ore and some excitement is resulting. This is under exploration by the Bird Iron Company, who are now having a controversy with the Houghton County supervisors over the matter of royalties at the Bird. It is understood that the Oliver company have made offers to purchase the fee to this latter property and to all of Houghton County's lands in Iron County.

The Vermillion Range.

The fee holders of section 30, Vermillion range, have received several offers for their property, both leases and for purchase. They have decided to do nothing at present, but will make as careful a surface examination as possible, taking with them a geologist in whom they have confidence. Other mines of this range are working steadily and without much change, except that the old Minnesota mine, the first property opened in the State and a shipper since 1884, is looking better than for years, and has a larger reserve than for a long time. Several lenses of fairly good ore, though not so fine as the Minnesota's early shipments, have been found by diamond drill working at great depth, and these will continue the mine's career a number of years longer than was expected. The large lens of ore found last year by drills working in the bottom of Montana shaft is being opened and mined and shows up an immense deposit of excellent ore. The company are working eight diamond drills about the mine searching for additional lenses, a policy that has been the rule for some years. At the Pioneer, Chandler and Savoy about 100,000 tons of ore are hoisted monthly, and large stock piles will be on hand at the opening of navigation.

It is reported that the Hawkins-Kinney property in section 32 T 57 R 22, Mesaba range, on which a very large deposit of mixed ore has been shown, has been sold to a large machinery manufacturing concern. The report is denied and the denial, in this case, may be correct. M. L. Fay has secured and will open two small ore bodies near Hibbing. Both will be underground mines. He claims to be able to put out 50,000 tons at each place this year. This claim is of a piece with many others on which high water predictions of a Mesaba output are based. Some 2500 acres in the northwest part of T 58 R 14, at least a mile south of where the Virginia slates are supposed to bound the ore bearing formation, have been taken for exploration, and crews have just started sinking. The Oliver Iron Mining Company (United States Steel) have so changed their articles of incorporation as to make Duluth headquarters and existence perpetual.

Edwin Victor Clergue, general manager of the Algoma Commercial Company, and mining manager for the extensive Clergue interests centering at Sault Ste. Marie, died at Chicago a few days ago of heart trouble brought on by exposure in his work about a year ago. D. E. W.

The American Rolling Mill Company.—The American Rolling Mill Company, whose general offices are in the Rookery Building, Chicago, have purchased the rolling mill at Sandwich, Ill., which has been idle for some time. This plant has a 9-inch finishing train of rolls and an 18-inch three-high muck mill. Within a few weeks the company will arrange for a 16-inch train of finishing rolls and will also build eight double bushelling and puddling furnaces. These improvements will place the works in good condition and will enable the company to considerably increase their production of bar iron. They are further starting their basic open hearth steel furnace at Muskegon, Mich., and will begin to roll billets in a few days. Another open hearth furnace will shortly be built at this plant, which will more than double its steel capacity. They will need most of the billets produced here for their own use.

Worcester Industries.

WORCESTER, MASS., January 27, 1902.—The Morgan Motor Company have been incorporated under Massachusetts laws, with a capital stock of \$50,000, to manufacture steam trucks. The president is Charles H. Morgan, president of the Morgan Spring Company and Morgan Construction Company; the treasurer is Paul B. Morgan, secretary of the Morgan Construction Company, and these officers and Ralph L. Morgan constitute the Board of Directors. The motor is the invention of Ralph L. Morgan, who is one of the consulting engineers of the American Bicycle Company, and is now living at Toledo, Ohio. The motor will burn some form of petroleum fuel which is cheaper than gasoline. The company will not build a plant at present, but the business will begin either in the shops of the Morgan Construction Company or in shop space hired in the neighborhood. Whether the company will manufacture the trucks complete or only the motors and other mechanical parts is not decided. One of these steam trucks has been in operation in Toledo, Ohio, for a year and has given satisfactory results. It is a heavy vehicle, of 4 tons capacity, and has received severe tests.

Charles H. Morgan and J. R. George, one of the engineers of the Morgan Construction Company, have gone to Germany, to be absent about six weeks. They are on business connected with the combustion engine manufactured by the Morgan Construction Company.

The Wright & Colton Wire Cloth Company, manufacturers of wire and wire specialties, have voted to increase their capital stock from \$250,000 to \$300,000. The additional capital is necessary because of the company's great increase in business. Last year a business of \$700,000 was done, which was an increase of nearly 20 per cent. over 1900, which, in turn, was a 20 per cent. increase over the year before. The business came to Worcester 12 years ago, when their capital stock was \$50,000, and additions to capital have been made from time to time to keep up with the enlargement of business. Last year 7 per cent. dividends were paid. The officers are: President, George F. Wright; treasurer, George M. Wright; assistant treasurer, Herbert N. Wright. Directors, these officers and O. W. Norcross and George T. Dewey. The company also conduct a wire mill at Palmer, Mass.

The business of William Allen & Sons has been incorporated under Massachusetts laws, with a capital stock of \$40,000, under the name of the William Allen & Sons Company. The concern manufacture boilers and have been in existence since 1875. The officers are: President, William Allen; treasurer, Walter B. Allen. Directors, these officers and William P. Allen.

The Stewart Boiler Works have received an order from the Lancaster Cotton Mills of Lancaster, S. C., for a battery of six upright boilers, of 200 horse-power each. The boilers will be 7 feet in diameter and 19½ feet in height. The contract price is about \$10,000.

The Worcester Umbrella Company are about to be incorporated, the necessary \$25,000 having been subscribed. They will be a Massachusetts corporation.

The Plunger Elevator Company have been awarded the contract for three elevators with 100-foot lift, and one ash lift, for a new building to be erected by the Pittsburgh Plate Glass Company, at Pittsburgh, Pa. Two of the elevators will be for freight and one for passengers.

The L. W. Pond Machine Company received an order for 30 planers from the Pennsylvania Steel Company, and negotiations are in progress for an order for ten more. The Worcester letter to *The Iron Age* has told of the first portion of this order, for 20 planers. This order has been largely increased. All of these machines are of the same size, 36 x 36, but for length of bed they vary from 8 to 13 feet. The earliest delivery will be within a few weeks and the company have until fall to complete the contract. The machines are to be used in the frog and switch department.

The Eastern Bridge & Structural Company of Worcester have been awarded the contract for the construction of a steel tower for the New York, New Haven & Hart-

ford Railroad's Forty-sixth street engine house, New York. The tower will be 15 feet square at the base and 60 feet high. It will be capped by a small houselike structure of corrugated iron, in which will be located the blower for the new ventilating apparatus of the engine house. The foundations, which must be unusually strong because of the great ratio between height and diameter of base, will consist of four concrete pillars sunk into the earth to the depth of 6 feet, through which will run heavy steel bolts. The contract calls for the completion of the tower within 30 days.

The American Diesel Engine Company, one of the companies fostered by the International Power Company, have combined with a British company owning the rights to build the Diesel combustion engine in Great Britain and her colonies. It is given out in Worcester that the two companies have been merged and the manufacture of the engines for all the United States and Great Britain will be done at the Southgate street plant of the International Power Company, which is being fitted for business. Some of the machine tools ordered for the plant have been delivered, but for the most part the machine tool builders are very slow of delivery.

This same condition exists at the new shop of Loring Coes & Co., Incorporated, in which wrenches will be manufactured. The new shop is all ready for business excepting that some important tools have not been delivered. The new shop will start with about 100 employees. Loring Coes, the owner of the new business, is interested in the Coes Wrench Company of Worcester, but the two concerns, it is understood, will have no connection with each other.

The Washburn & Moen department of the American Steel & Wire Company is to add a large building to its North works. It will be devoted to the bale tie department, which has outgrown its present quarters, as the demand for the product has greatly increased. Besides this addition and that at the South works for the copers and venetian red department, already told of in *The Iron Age*, a number of smaller additions to the department's buildings are projected, to be built during the coming spring and summer.

A new company are organizing in Worcester for the manufacture of a trolley stand, of which Eugene Parker is the inventor, and room has been taken in the Stevens Building, Southbridge street, for its manufacture.

The 7000 horse-power engine which provides power for the new blooming mill of the South works is running again, after a shut down of ten days, caused by the blowing out of the cylinder. The engine is of the reversing type, with single cylinder 44 inches in diameter and 60 inches in length, these being inside dimensions. The operating mechanism broke down and the engineer was unable to reverse the machine, which was using 3500 horse-power at the time. A thread was stripped, permitting a steel pin to drop; the steam was suddenly let into the cylinder at full pressure and the engine ran away. The engineers ran for their lives and got out in the nick of time. Both cylinder heads, each weighing 2040 pounds, were blown out, the 5-inch bolts, 18 inches long, which held the heads to the cylinders were stretched out to increase their length 1¼ inches; the piston rod, 8 inches in diameter, was buckled into an elongated letter S, and one of the eccentrics was twisted all out of shape. The old blooming mill was immediately put into operation, so that the break down was not so serious in its results as was expected. The Allis Company of Milwaukee, Wis., builders of the engine, hurried along duplicate parts, and ten days after the accident the engine was running again.

J. W.

According to the *Railroad Gazette* the total output of the eight locomotive building companies of the country, representing 15 plants, for the year 1901 was 3384. This is 231, or 7.3 per cent., more than in 1900, and the record. The output from 1890 to 1900 follows: 1890, 2240; 1891, 2865; 1892, 2012; 1893, 2011; 1894, 695; 1895, 1101; 1896, 1175; 1897, 1251; 1898, 1875; 1899, 2473; 1900, 3153. Less than 10 per cent. of the locomotives built last year were for export, as against about 16 per cent. in 1900.

The Iron Age

New York, Thursday, January 30, 1902.

DAVID WILLIAMS COMPANY,	-	-	-	-	-	PUBLISHERS.
CHARLES KIRCHHOFF,	-	-	-	-	-	EDITOR.
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RICHARD R. WILLIAMS,	-	-	-	-	-	HARDWARE EDITOR.
JOHN S. KING,	-	-	-	-	-	BUSINESS MANAGER.

Basic Open Hearth Steel Prospects.

The rapid increase in the number of basic open hearth steel furnaces, from present appearances, has brought the development of this industry to its limit. Manufacturers of steel have largely turned their attention to this process for special reasons. Chief among these have been the fitness of the product for a wide range of uses, the comparatively moderate investment necessary for the installation of a producing unit and the great supply of cheap material available for conversion by this process. The materials used are pig iron, containing a considerable percentage of phosphorus, and scrap iron and steel of almost any character, but scrap has been the main dependence. While all kinds of scrap can be utilized, yet for the production of certain classes of finished product, such as plates, sheets, tin plate and other commodities requiring great toughness, scrap of a selected character is required, such as soft steel of good quality and wrought scrap. It has been found that the number of basic open hearth furnaces recently brought into operation have in the aggregate so large a capacity that the supply of scrap suited to their purposes is scarcely equal to the demand. The result of this is seen in the high price now ruling on such material as old steel rails and other low phosphorus scrap. Some years since the fact was pointed out in these columns that the time would probably come when it would be found that the supply available for the manufacture of basic open hearth steel would not permit much further extension of this branch of steel industry. It now seems that this prediction is being verified, and notwithstanding the elements which prompt the construction of an indefinite number of basic open hearth furnaces the conditions are approaching, if they have not already reached, the point at which a further extension will depend entirely upon other matters than the supply of cheap scrap.

It has been found the past year that the furnaces of this character erected in sections of the country remote from large steel works were hampered quite considerably because of the difficulty encountered in securing a sufficient quantity of the character of scrap desired. It is believed that, if a frank expression of opinion could be obtained, the builders of basic open hearth plants in such localities would concede that the advantages which were expected from this process have not been realized. Instead of being able to operate such furnaces on a great proportion of scrap, it is becoming more and more necessary to use large quantities of pig iron. The demand for pig suitable for basic open hearth conversion has caused the price of this class of material to advance almost to an equality with Bessemer pig. This removes one of the chief elements leading to the adoption of the open hearth process. The supply of this character of pig can, of course, be increased, but the increase simply comes about through the heavy demand for it which has raised its price. And to thus raise the cost of material is to diminish the ability of the process to maintain its growth.

A view of the situation leads to the belief that the

manufacturers of steel products who have expected to place themselves in a position of independence by the erection of their own steel plants will not hereafter find this so attractive a proposition as it seemed to be a year or more since. The policy of the large interests is undoubtedly to keep down the price of finished products. They propose through their ownership of unlimited supplies of raw material to place themselves in the position of making their profits from the economy of their operations and not through high prices charged the consumer. They are conducting their operations on such a heavy scale that even their purchases of scrap are so great as to badly handicap the small manufacturers who seek to operate independent steel works. The demand coming from the large as well as small buyers of such materials keeps up the price and probably will keep it up as long as the steel trade is in its present condition of activity. It therefore seems necessary that those who are contemplating investments in basic open hearth plants should endeavor to fortify themselves by controlling their supplies of raw material, including both iron ore and coke. Only by so doing can they secure their raw materials at a cost which will permit them to turn out a product at a sufficiently low cost to enable them to be factors in the market for finished products. This has always been a sound policy for those who produce iron and steel on a large scale. It now seems to be necessary for those who expect to engage in the business to a limited extent.

Reforming Our Drawback System.

Our Washington correspondent reports that an effort is being made to bring about a simplification of the drawback laws, a reform which is sadly needed. The old identity clause, which required that the actual raw material imported be used for the production of the articles exported, should be brushed aside entirely. We cannot help believing, however, that the French drawback system should be carefully studied before modifications are adopted. That system, known as the *acquit-à-caution* method, goes a good deal further than the practice adopted by the majority of nations. Upon the importation of a given amount of raw material, at any point in France, the importer pays the full duty and is given a certificate for the sum so paid. This certificate is marketable, and the sum it represents is refunded by the Government upon proof of export of an equivalent quantity of product, advanced in manufacture, from whatever point in the country it may be shipped. In France, in the iron industry, for instance, pig iron is imported in the North. The drawback certificates are purchased by rolling mills or foundries in the South when they export to Mediterranean markets.

In this country such a system would possess particular advantages for holding the Pacific Coast trade, and would be quite a powerful aid in developing the manufacture of the cruder forms in that section. It would enable manufacturers of castings or rolling mill products on the Pacific Coast to purchase pig iron made on the Pacific Coast and market the finished goods in China, Japan, Australasia, &c., by securing the drawback on the pig iron imported into the Atlantic Coast States, less the amount which they have to pay the Eastern importer for the drawback certificate. In the case of pig iron, for instance, the tonnage of foreign material thus brought in would be a trifle in so large a consumption. The amount of money saved and representing the diversion of work to this country would be the difference between the freight on the finished goods from a European port to the consumer's port on the

Pacific, on the one side, and the freight on pig iron from the European port to the Atlantic Coast port, plus the freight on the finished goods from our Pacific Coast port to the consumer's port on the Pacific on the other side.

There are probably many industries thoroughly established in the Atlantic Coast States which would not be called upon to make any sacrifices while conferring very important advantages in aid of the development of industries on the Pacific Coast, which suffer from a relatively restricted home market. They might in this way hold export business which otherwise would go to foreign manufacturers. The latter would get only the work of making the crude material instead of securing the whole trade.

PERSONAL.

Judge E. H. Gary, chairman of the United States Steel Corporation, has been elected chairman of the Board of Directors of the Allis-Chalmers Company.

B. H. Warren, vice-president of the Westinghouse Electric & Mfg. Company, at East Pittsburgh, has resigned his position. Mr. Warren has been with the Westinghouse Company for many years and has made a number of trips to Europe in the interests of the concern. He will possibly be succeeded by Frank H. Taylor, now fourth vice-president.

Leon E. Thomas has been appointed assistant superintendent of the works of the Lloyd-Booth department of the United Engineering & Foundry Company, at Youngstown, O.

Addison Boren, Jr., has resigned his position as treasurer of the Best Mfg. Company, of Pittsburgh, in order to devote his entire time to private interests. He has been succeeded by Charles R. Rall.

James Inglis, manager of the American Blower Company of Detroit, Mich., was elected president of the Merchants & Manufacturers' Exchange in that city at its annual meeting a few days ago.

Important gifts have come to the Cooper Union of New York. Andrew Carnegie has added \$300,000 to a like sum given last year, and the descendants of Peter Cooper, including Edward S. Cooper and his sister Sarah Amelia Cooper, and Abram S. Hewitt and his family, have contributed \$300,000, doubling their gift of last year.

Charles H. Morgan, president of the Morgan Construction Company, of Worcester, Mass., sailed for France on the 21st inst.

Joseph Hilton has resigned as superintendent of the Cambridge Rolling Mill of the American Steel Sheet Company and the mill is now under the general management of Alexander Robins.

Frank Pettit has resigned his position as chief draftsman for Dickson Works of Allis-Chalmers Company, Scranton, Pa. Mr. Pettit will locate in the Pittsburgh district.

Robert Luce, president of the Press Clipping Bureau of Boston, has been appointed House Chairman of the Committee on Election Laws of the Massachusetts Legislature.

H. R. Barnhurst, for many years general superintendent of the Erie City Iron Works of Erie, Pa., has been appointed superintendent in charge of the new shops of the Allis-Chalmers Company, at West Allis, near Milwaukee, Wis.

The Inn, at Vandergrift, Pa., was the scene, on Friday evening, January 24, of a dinner given to Manager Eugene W. Pargny of the American Sheet Steel Company, in honor of his return from Europe after an absence of three months. The affair was planned as a little surprise by Mr. Pargny's friends of the Vandergrift-Apollo unit, and was attended by the heads of all the departments of those works, which included the mills at Vandergrift, Apollo, Leechburg, Hyde Park and Saltsburg, which mills are all under the direct management of Mr. Pargny, with S. Arch Davis as division super-

intendent. The latter, as master of ceremonies, made the address of welcome, calling forth a very nice response from Mr. Pargny, after which each one present made a few remarks, assuring the manager of their continued hearty support in striving to maintain the high position their works hold as a part of both the American Sheet Steel Company and the United States Steel Corporation. Among the guests from out of town were P. F. Smith, manager Woods and Wellsville works; S. B. Ely, chief engineer, and R. A. McKinney, purchasing agent.

A. S. Valentine has resigned as assistant treasurer of the Pressed Steel Car Company in order to connect himself with the Standard Steel Car Company. P. G. Jenks of the New York office of the Pressed Steel Car Company has succeeded Mr. Valentine as assistant treasurer.

Mexican Mine Labor.

In a very exhaustive report on the coal fields of Esperanzas, Coahuila, Mexico, Edwin Ludlow, the general manager of the Mexican Coal & Coke Company, refers as follows to his experience with labor in developing the large property under his charge:

We have tried importations of American, negro, Japanese, Chinese and Italian miners; but not many of them would stay—the Americans preferring to work in the coal fields of the United States, while most of the others were unaccustomed to any kind of mining, and only a few of the best had the requisite perseverance to stick by us and learn how to mine coal.

Our Mexican labor we have had to teach and train. Many of our workmen of this class, coming from farms and cattle ranches, knew nothing about mining, and few of them appreciated the necessity of continuous labor; while many of those who came from the metal mines were more difficult to teach than green laborers, since their previous ideas of mining have to be eliminated before they can be taught to work for the large output necessary to a successful colliery operation. From some of the low grade mining camps, like Sierra Mojada, however, we have obtained men who became, in a few weeks, good average coal diggers, and some Mexicans have learned to be really expert, and would be so considered in any field. These cases are, however, exceptional. An idea of the Mexican laborer's manner of working can be formed from the fact that, when we first put in tippie scales and paid the men by the ton for mining, they would invariably follow the car they had loaded out of the pit and find out how much it weighed before loading another.

A study of the different results in the same mine, from the various classes of miners, gives the following averages in number of tons per day loaded in pit cars: Americans (good miners), 10; negroes (good miners), 8; Italians (fair miners), 6; Japanese (fair miners), 5; Mexicans (green), 2, and Chinese, 4 tons per day. No average can be given for any Mexican miners except the inexperienced ones, since the expert Mexican miners all become contractors, employing from 6 to 20 laborers, and directing and inspecting, rather than personally laboring.

The boys are our strong hope. They work better and more steadily than the men, and, growing up to a daily routine of occupation, they will make better workmen than their fathers, who come to the mines from the intermittent working life of the farm or ranch. There has been also a marked improvement in some of the men. Many who came here when work was first started, wearing blankets and sandals, now dress in good style, wearing shoes, often of American make, and the sale of American furniture and cooking stoves is constantly increasing.

As hoisting engineers and helpers in the machine shop we have found the natives good, where the work is laid out for them, but they lack initiative in taking hold in case of any break down, and it is necessary to keep American foremen in nearly every department. As mechanics, carpenters and blacksmiths we are always able to get Mexicans competent to do any work laid out for them.

A Possible Solution of a Perplexing Question.

EGBERT P. WATSON, ELIZABETH, N. J.

"Times were never better in this country," said a middle-aged machinist to me a few days ago, "than when a man could go out and get a job for himself, at his own price, without asking leave from any one. Now if I want to work I have either to join a union (which I don't believe in), or else be looked upon as an interloper and a man who has no right in the town at all. It seems to me it's a curious state of things in this country when a man can't follow his own inclinations as to selling his labor, but must put it into a kind of a joint stock co-operative concern with Tom, Dick and Harry, who don't know the first thing about carrying on any business, and can't keep jobs when they get 'em. These fellows have no responsibility to any one, not even themselves, for they shirk on each other whenever they can; when any one tries to hold 'em up for lapses or transgressions, there is no one to answer that is worth a cent. I don't like it myself, and would like to see the old times back again."

This is by no means a solitary instance of dissatisfaction with the state of affairs among artisans who wish to exercise their own judgment as to where they shall work, and upon what terms they shall sell their time; it never will be settled until those who are chiefly interested free workmen, untrammelled by associations which demand total surrender of their individuality—stand for their rights. "Who would be free themselves must strike the blow," that seems to be the way out of the labor labyrinth.

Business and Philanthropy.

Certain recent essayists in the technical press feel that a combination of business and philanthropy would be a good thing, and so soften the hearts of walking delegates and their abettors that they would cease to walk, and withhold from meddling with what is surely no part of their concern, undertaking to manage the business end as well as the details of shop management. It has always seemed to me that this, instead of ameliorating present conditions would tend to aggravate them, for the workmen look upon all ultra refinements in their surroundings as merely sops to Cerberus, to prevent them from growling at what they are pleased to call restrictions. From a certain aspect of this feature they are right. Not, however, when they protest against purely sanitary improvements, lavatories, secluded latrines and improved facilities generally, but in the direction of fancy bathrooms (as the men call them), hospitals for the temporarily indisposed, lunch rooms where certain things are given to them, and a generous bill of fare provided at cost the average workman is inappreciative; it is the average man who has to be dealt with, and considered in discussions of the situation. The features and surroundings of modern shops just cited form no part of the daily lot of the workingman, and instead of being grateful to those who provide them, he is prone to resent them as something he does not need, and certainly will not always find in his journey through life. The workingman is, as a rule, nomadic, particularly young men without families who constitute a large portion of the shop force; these have been so brought up in early life that what seem to others differently trained as necessities are to them superfluities that have nothing whatever to do with a fair day's work for a fair day's wages. They never had such facilities before, and will not have them again when they go elsewhere, so they look upon them as fads of the management in which they have neither interest nor concern. Here and there are men who have inherited tastes which lead them to appreciate the advantages offered in the direction mentioned, but they form a small part of the material available to carry on manufacturing operations. As a process of elimination, weeding out undesirable help and retaining those who can understand the benefits to be derived from a higher scale of living, there is no question but that the systems described previously have a certain value, but they are too slow in results achieved for any concerns except those which have a large surplus and established busi-

ness that do not demand prompt returns. One thing I think may be safely said: The educational shop system, so to call it, will not answer for the innumerable small businesses all over the land, and if this is true the plan itself as a means of relieving the strained relations existing at present between employer and employed may be set aside as impracticable. Workingmen do not want to be coddled; they are perfectly willing to work in places that are quite unfit to work in if they see that their employers are unable to provide better, and will endure temperatures, both hot and cold if the "boss" shares their discomfort. I have seen men—machinists—chipping castings out of doors in December with the mercury standing nearly at zero, without any more than a growl at the clerk of the weather for providing an inferior quality of it. The same men, too, curiously enough, would resent sympathy as being, in some sense, an imputation upon their manliness.

Education.

In the matter of education, it has become very much the fashion to represent the modern mechanic as hungering and thirsting after knowledge; he feels the want of better information than he had opportunity to obtain in his youth, and only lags behind his fellows because he cannot "figure," or does not understand the principles of the work he is engaged upon. This may be true, and is, in isolated cases; but such individuals only prove the exception to the rule, which last is, as I have found it all over the country, wherever I have worked, that the average man does not require, or even desire, to be better educated. He sells muscle and manual dexterity only, and does not need any theory or a knowledge of x plus y to obtain the highest wages in his craft. Such men sometimes are called "ignorant," but that is an absurd appellation. What are they ignorant of, pray? Binomial theorems, no doubt, and the meaning of a geocentric parallax, but they are in no wise concerned with these, and would not get a penny more for their labor if they had the fullest knowledge of them. Education is a word that means nothing whatever in isolation; the forest runner is a highly educated man in all that pertains to the means by which he lives and has his being; he can find his way back to civilization through a wilderness that would appal the man of the schools. Professors of this or that science are educated men only in the sense that they have traveled the same ground that their fellows did ages ago, and have digested mentally the discoveries or theories of others. In exceedingly rare cases have they added to the sum of proven facts available to all. The expert workingman is an exceedingly highly educated man, when he has acquired a full knowledge of all the routine and the several processes needed to produce a highly finished piece of machinery; that he professes to understand, and he spares no pains or labor to make himself a past master of his profession. This aspect of the mental status, or intelligence of the workingman will not, possibly, be accepted by some, but so far as my observation and actual participation in the daily work of a shop goes it is correct, and I have apparently wandered from the caption of this article in dwelling upon it; not very far, however, for the preceding paragraphs go to show that the work people of this country understand the issues at stake very clearly.

Associations of Free Workmen.

Now, if all could be brought to a realizing sense of the folly of arraying one side against the other there would be an end of misunderstanding and overt acts. At present there are two camps, more or less hostile in their attitudes, and unable to arrive or settle upon any common ground of interest, but sooner or later I hope that a different spirit will prevail. Failing this, the only alternative (certainly the only course now) is to meet or organize with organization, and see what that would effect. I do not refer to combinations of employers against workmen, but to associations of what may be called free workmen, as distinguished from those who are not independent in any sense of the word, having sold out their privilege to act for themselves to certain persons whom they call leaders. Suppose, for example, that there are in a town 600 workmen of all trades. According to the best information I can get a minority of these

will be union men, the others being independent, or desiring to sell their own ability instead of relying upon others to sell it for them. There is every reason why such independent workers should affiliate and join their interests, to the end that they may exercise the right and privileges that belong to them under the constitution. Let them have their meeting rooms, their business agents, or persons who will look after the affairs of the associations, precisely as any other aggregation, when, honesty of purpose and energy in prosecution being present, their success is assured. With this scheme in force there would be an end of walking delegates, or idlers who have no excuse for their being, an end of dictation to employers as to terms, wages, apprentices or other conditions upon which they would be permitted to take contracts, an end of futile strikes, because there would be two parties from which to secure help, and forever an end to numerous interferences with business management.

Union Dictators and Non-Union Dictators.

I have talked with intelligent nonunion men as to the possibilities of this plan for their relief, and, to be candid, it did not meet with approval from all. A majority seemed to feel that it was entirely possible in its scope, but thought that it would be difficult to get all nonunion men into such an arrangement; there would be a number who thought that they might as well have union dictators as nonunion dictators, for some of their own members would assume the conduct of affairs and lead them into legal and other difficulties where they would incur fines and penalties of one sort or another; but these nonunion men were like the faint hearted one spoken of in the Scriptures, "There is a lion in the streets, I shall be slain without!" Certainly in the scope of the plan suggested there is nothing to object to, but if nonunion men are in earnest in desiring to be free of dictation from unions as to when, where and how they shall work, they can accomplish it by organizing, just as union men carry out their objects through following the same course. Difficulties there certainly will be; half hearted, indifferent individuals are to be found everywhere; persons who not only want others to provide bread, but also spread butter on it before they will even consider accepting it; but the success of any project, while it may be delayed, is not wholly frustrated by the presence of dead wood if there are capable men at the head of it.

It would be necessary in some localities possibly for nonunion men to take advice from persons familiar with the work of organization, in order that everything may go smoothly; these persons might be either lawyers or employers; the last, preferably, because they have a vital interest in the outcome or success of the undertaking; but where this is undesirable for any reasons there is nothing to prevent independent men from standing for their rights to exercise their own judgment in the matter of selling their labor to the highest bidder wherever and whenever they please.

The Youngstown Iron & Steel Roofing Company.

The new sheet mills of the Youngstown Iron & Steel Roofing Company, which were started up in September, are running very satisfactorily. The concern are manufacturers of both black and galvanized sheets in iron and steel, iron and steel roofing and siding, Youngstown corrugated expanded metal lath, trough bridge flooring, fire proof flooring and other specialties. Rolling their own sheets for the manufacture of these goods, the concern are able to guarantee quality. C. A. Cochran has recently been appointed secretary of the company. L. E. Cochran, who has been in the iron business in the Mahoning Valley for many years, is president; G. M. McKelvey, vice-president; Mason Evans, treasurer, and John O. Pew, general manager. The concern maintain branch offices in Philadelphia and also in the Park Building, Pittsburgh, the latter office being in charge of L. E. Aber.

The Juniata Tin Plate Company, capitalized at \$250,000, will build a Black Plate mill and Tin Plate factory at Greencastle, Ind. F. M. Strong, for several

years manager of the Elwood plant of the American Tin Plate Company, has resigned that position to take charge of the new company. Associated with him are Samuel Lewis, William H. Richards, J. H. Seiberling and H. M. Strong.

OBITUARY

CHARLES P. DEANE.

Charles Pemberton Deane of the International Pump Company of New York died at the home of his sister, Springfield, Mass., on January 9, in his fifty-seventh year. Death was caused by blood poisoning resulting from erysipelas. Mr. Deane was born in Boston, January 20, 1845. He went to Springfield in 1857 with his father, the late George H. Deane, when the latter was appointed agent for the management of the mills at Ludlow, Mass. He was educated in part at Brown University, and after leaving college joined his father in the work at Ludlow. He had a marked talent for mechanical and scientific pursuits, and when still quite a young man invented the Deane steam pump, which later became the basis of a large industry. Early in the seventies the elder Deane gave up his position at Ludlow and joined his son in the manufacture of the Deane pump. Later the enterprise was organized as a corporation and moved to Holyoke, Mass., where they enjoyed a long career of prosperity. Charles Deane continued one of the active managers of the business until the company were finally absorbed in 1899 by the International Pump Company, with whom he had since been associated.

CHESTER GRISWOLD.

Chester Griswold, president of the Crown Point Iron Company of Troy, N. Y., died suddenly of apoplexy on January 23 at his home, 23 West Forty-eighth street, New York. He was born in Troy, N. Y., in 1844, his father, John A. Griswold, being the owner of Bessemer steel rights in this country and operating a large plant at Troy. Chester Griswold went into business with his father and on the latter's death became the president of the Crown Point Iron Company. He was also a director of the Hudson River Ore & Iron Company and of the Adirondack Railway Company. For many years he represented the Troy mill in New York when that plant was one of the leading steel producers in the country. A somewhat remarkable coincidence is noted in the fact that his brother, John Wool Griswold, head of the Griswold Wire Company of Braddock, Pa., and the J. Wool Griswold Wire Mfg. Company of Troy, and a member of the Dillon-Griswold Wire Company of Sterling, Ill., died suddenly from apoplexy at the Virginia Hotel, Chicago, three weeks previously.

NOTES.

COL. JAMES T. GRIFFIN, who died on January 21 in London, England, aged 78 years, was a pioneer in the introduction of American agricultural machinery into England. He was born in Rochester, N. Y., and for many years was associated with C. H. McCormick & Bros., manufacturers of agricultural machinery. For 18 years he was the European representative of the Walter A. Wood Reaping & Mowing Machine Company of Hoosick Falls, N. Y.

HENRY MORRIS, after a short illness, died of pneumonia on January 25 in Philadelphia, aged 42 years. He was a son of Henry Morris, one of the widely known firm of Morris & Tasker. After receiving his education Mr. Morris was connected for some time with the I. P. Morris & Co. Machine Works of Richmond, and up to the time of his death was secretary of the American Pulley Company.

BENJAMIN F. TAYLOR, for long a prominent iron-master of Pottstown, Pa., died in that city on January 21, aged 80 years. Mr. Taylor operated the Charming Forge & Charcoal Furnace for many years, retiring from business in 1890.

ERNEST VICTOR CLERGUE, who was connected with the industrial works at Sault Ste. Marie, Mich., died last week in Chicago of heart disease, aged 41 years.

Central Pennsylvania News.

HARRISBURG, PA., January 27, 1902.—The Lalance & Grosjean tin plate mills this week put into operation the new foundry built at the works in this city. It is the first of improvements to be made to the works.

Denial has been given here and at Coatesville to the rumor that the independent steel plate making concerns intended to build a universal mill in the Pittsburgh district. How the report started no one seems to know. The Central, Worth Brothers, Lukens, Tidewater and other concerns are busy with the additions and work at their own plants, which are the leading ones in Eastern Pennsylvania engaged in such production. Neither is much credence given to the story that the Alan Wood Company of Conshohocken will embark in a new combination of sheet steel makers.

The American Iron & Steel Mfg. Company have started up their West puddle mill at Lebanon. The other mills of this works will also be started for the winter work.

The Middletown works of the National Tube Company have started up after a short shutdown for stock accounting and overhauling. The works have a large number of orders ahead and considerable material is being made for export.

The Crum Lynn Iron Works at Chester, which were rebuilt recently, were slightly damaged by fire a short time ago.

The Wolf Company have been formed, at Chambersburg, by H. G. Wolf and a number of Philadelphia capitalists. They have a capital of \$350,000 and a charter has been secured from the State. H. G. Wolf, a well-known manufacturer of Chambersburg, is the owner of the greater part of the stock. The company will manufacture machinery.

Among the companies chartered at the State Department at Harrisburg lately are the Joseph Woodwell Company, capital \$140,000, Pittsburgh; J. C. Tanger Company of Hanover, capital \$100,000; Dowerman Rivet & Bolt Mfg. Company, capital \$10,000, Pittsburgh.

At the annual meeting of the Scranton Bolt & Nut Works last week the following directors were elected: W. D. Zehnder, L. M. Horton, C. H. Zehnder, O. S. Johnson, C. C. Rose, C. H. Welles and J. A. Lansing. The report showed that the plant had had a most successful year and had been running day and night to meet orders. During the year a number of important additions had been made to the works, as well as to the machinery.

The Norway Iron & Steel Company held their annual meeting at York and these officers were elected: President, W. F. Bay Stewart; vice-president, Charles James; secretary, H. H. Weber; treasurer, C. C. Frick; general manager, Charles James. A good report was made, it being shown that business had increased and that the works were running day and night, enough orders for a year being on hand. New annealing furnaces are being added, as well as a new steel furnace.

The National Steel Refining Company.—There have been recently organized under the laws of the State of Delaware, with a chartered capital of \$1,500,000, the National Steel Refining Company. The officers are George R. Reinhart, president; B. K. Jamison, vice-president; John W. Woodside, treasurer; Frank M. Wirgman, secretary; Clinton A. Higbee, general manager, and A. A. Du Ban & Co., auditors. The company have secured an existing plant at Carnegie, near Pittsburgh, where their business consists of turning out, under the Jamison process, high grade tool steel, which acts as a substitute for crucible steel, but can be produced at a much less price. The company are backed up by some very strong capitalists in Philadelphia. While it is probable that the plant at Carnegie will be enlarged by adding additional steam hammers and rolls, another plant may possibly be established. The office of the treasurer, John W. Woodside, is 372 Bullit Building, Philadelphia; the executive office of the company is 618 Bourse Building, Philadelphia.

MANUFACTURING.

Iron and Steel.

Jones & Laughlins, Limited, of the American Iron & Steel Works, have recently purchased 15 acres of land adjoining their plant on the South Side, Pittsburgh. The property extends from Thirty-first to Thirty-fifth streets and lies between Carson street and Monongahela River, and will be used for making additions to this already enormous plant. While the exact character of these additions has not yet been definitely decided upon, it is probable that the first new works to be built will be a structural fitting shop, and it is certain new structural mills will also be built within a year or two. The Talbot Furnace being built by Jones & Laughlins, Limited, is nearing completion and is expected to be ready for operation in April. Should the furnace prove successful, a second one will be built.

Two mills of the sheet plant of the Maryland Sheet Steel Company, Cumberland, Md., have been placed in operation. The 32-inch mill will be placed in operation shortly. The open hearth furnace in the plant which has been enlarged to 20 tons capacity, will be started about February 15. The blooming mill will also be placed in operation about that time, and the sheet bars required will be rolled from the steel made in the open hearth furnace. The mills are equipped to roll sheets from 10 to 18 gauge. The five steam hammers in the plant will also be started soon.

The G. L. Bollinger Company, structural engineers, of Pittsburgh, will build a small structural plant at Verona, Pa., and contract for the shop, which will be 50 x 100 feet, has been let.

One of the blast furnaces of the Lorain Steel Company, at Lorain, Ohio, has been blown out for relining and repairs. It is expected to start up again about March 1.

The directors of the Parkersburg Iron & Steel Company of Pittsburgh, whose sheet mills are located in Parkersburg, W. Va., met there last week and elected the following officers: H. H. Neiman, president; A. H. Gellfuss, secretary; John F. Budke, vice-president and general manager; H. S. Duncan, vice-president and business manager; L. A. Myvel, treasurer; A. E. Neiman, assistant treasurer. The directors are G. Succop, Captain W. H. Gellfuss, W. H. Paxton, Charles Gellfuss, Frank W. Budke, and A. P. Flowers, all of Pittsburgh.

The Ritter-Conley Mfg. Company of Pittsburgh, builders of iron and steel structural and plate work, recently made a shipment of tanks to San Salvador, where they will be used by a mining company.

The definite location for the new blast furnace to be built in Toledo, Ohio, will be determined within the next two weeks. Details in regard to furnace construction are now being considered by those having the matter in charge, and unless present plans are changed a modern furnace with a capacity of 350 tons of foundry and malleable pig iron per day will be built.

At the annual meeting of the Columbus Iron & Steel Company, Columbus, Ohio, held last week, the following officers and directors were elected: Col. H. A. Marting, president and general manager; Col. J. G. Battelle, first vice-president; F. H. Miller, second vice-president and sales manager; W. W. Marting, secretary and treasurer; Clark Lowry, A. H. Mitlendorf, C. M. Fenton and J. H. Frantz.

The muck and rolling mill of the Eleanor Iron & Steel Company, near Irwin, Pa., is in operation on single turn, and this week 12 puddling furnaces will be started double turn. The concern will manufacture merchant iron bars and skelp. George Robinstein is secretary and treasurer of the concern.

The George A. Hogg Iron & Steel Foundry Company of Pittsburgh, manufacturers of rolls and rolling mill machinery of all kinds, are crowded with orders and are running their plant night and day, with enough work ahead to keep them running full for seven or eight months. Among the principal contracts that they are working on is the machinery for the plant of William Jessop & Sons, which is now being erected at Washington, Pa. The order for Jessop & Sons covers the rolling mills, shears and roll lathe. An order from the Colonial Steel Company of Pittsburgh has been received for five vertical double mandrel shears, motor driven. Each of these shears will weigh from 50,000 to 60,000 pounds. Also an order from the Hager Steel & Iron Company of St. Louis, Mo., for one double vertical lever shear; an order from the American Sheet Steel Company of Pittsburgh for one 55-inch and one 38-inch roll lathe; an order from the Crucible Steel Company to equip their Spaulding & Jennings works at Jersey City with a Freeman furnace charger; an order from the Montreal Rolling Mills Company of Montreal, Canada, to equip their plant with the Freeman furnace charger; also an order from the Wright Shovel Company of Anderson, Ind., for a 22-inch mill complete.

A meeting of the stockholders of the Youngstown Iron, Sheet & Tube Company was held in Youngstown, Ohio, on January 23, and the capital stock of the company was increased from \$2,000,000 to \$4,000,000. An increase was made in the Board of Directors, H. C. Dalton of Pickands, Mather & Co. of Cleveland and James Parmlee, also of Cleveland, being added. S. V. Hubner & Co., consulting engineers, of Pittsburgh are drawing plans for the open hearth plant to be built

by this concern, and which will also comprise a blast furnace to supply metal. The puddling department of the Youngstown Iron, Sheet & Tube Company has been started, making iron from which iron sheets will be rolled for covering their own buildings.

Representatives of the Jubiter process for making steel are in Kirkland, Wash., for the purpose of selecting a site for a steel works. The long idle steel plant in that place is being inspected, and if satisfactory arrangements can be made it is probable that location will be secured.

General Machinery.

The Hunt Foundry & Machine Company, 424 Fifth avenue, Pittsburgh, recently incorporated with a capital stock of \$100,000, all of which has been subscribed, are a consolidation of the Hunt Air Brake Company, and the Kensington Foundry of New Kensington, Pa. The new company will manufacture the same line as heretofore made by the Hunt Company, street car brakes, portable and stationary air compressors, and small refrigerating plants, to which will be added brass and iron castings. Later the offices will be located in the Frick Building, where they have leased a suite of rooms. H. E. Hunt is treasurer.

The Totten & Hogg Iron & Steel Foundry Company of Pittsburgh are furnishing six Freeman patent annealing furnace chargers to the Montreal Rolling Mill Company, at Montreal, Canada.

The Pennsylvania Engineering Works, New Castle, Pa., have received orders for two converters for the Shenango Valley Works of the National Steel Company; two for the Cleveland Works, and one for the Shoenberger plant of the American Steel & Wire Company; three for Henry Alken, engineer, destined for the Colorado Fuel & Iron Company, at Pueblo, Colorado; two for the Cambria Steel Company, at Johnstown, and one for the Carnegie Steel Company. In addition to the above, the Pennsylvania Engineering Works have a very large amount of other work on hand.

Among recent orders received by the York Mfg. Company of York, Pa., are the following: Keystone Brewing Company, Dunmore, Pa., 25-ton refrigerating plant; Louis Payssl, New Orleans, La., 25-ton ice making plant; Peckham Ice & Coal Company, Troy, N. Y., complete 15-ton ice making plant; United Ice & Supply Company, Pittsburgh, Pa., 50-ton ice making plant; Santa Fé Ice Company, Fort Worth, Texas, 30-ton refrigerating machine; American Soda Fountain Company, Boston, Mass., 10-ton refrigerating outfit; National Refrigerator Company, Colorado Springs, Col.; 25-ton ice making plant; National Refrigerator Company, Durango, Col., two 10-ton refrigerating machines; National Refrigerator Company, Joplin, Mo., machinery for 25-ton ice making plant; National Refrigerator Company, Dodge City, Kan., 10-ton ice making plant; Mangum Ice & Cold Storage Company, Mangum, Okla., 10-ton ice plant.

The National Tool & Machine Company and the Central Foundry & Machine Company, Reading, Pa., have consolidated under the name of the latter. The plant of the National Company will be combined with that of the Central Company, which is being extensively enlarged. The capital stock has recently been increased from \$7000 to \$18,000.

The Berlin Machine Works, Beloit, Wis., have plans prepared for the erection of two additions to their plant. One will be 200 feet square, the other, 200 x 85 feet.

The Akron Gear Company, Akron, Ohio, manufacturers of wagon gears, advise us that they will be ready to purchase considerable new machinery as soon as their plans have been definitely decided upon. They recently bought the plant of the Holman Gear Company of Valparaiso, Ind., which they will move to Akron, where they have their new buildings, 50 x 100 feet, under roof and nearly ready for occupancy.

H. Wetter Mfg. Company, Memphis, Tenn., manufacturers of stoves, ranges, stamped, plated and japanned tinware, have made arrangements for rebuilding their plant, recently destroyed by fire, in which they expect to be turning out a large quantity of steel ranges and steel cook stoves within 30 days, and within five months they expect to be making a full line of steel and cast goods. The new plant will be up to date in every respect and will be about the same size as the old one, occupying about a block of space. The company lost their entire plant by fire January 14. In the meantime all orders are being shipped from their branches at Louisville, Ky., and St. Joseph, Mo., both of which have a good stock on hand.

The National Mfg. & Supply Company, Saginaw, Mich., recently organized for the purpose of manufacturing steam specialties and dealing in mill and manufacturers' supplies, including some lines of machinery, have opened up the jobbing end of their business and are now ready to supply the trade. It will be some months before they start up the manufacturing department. The officers are J. D. Swarthout, president and treasurer; H. L. Ansted, vice-president and manager, and J. J. Brewer, secretary.

The Grant Tool Company, Franklin, Pa., had their new works in full operation on October 1, since which time they have been kept busy manufacturing their line of tools. They have had a specially heavy demand for a new axle lathe for turning car axles, which has several unique features, one being an open side arrangement for inserting the axle, parallel with the bed. The lathe is also specially designed for use of the new Taylor-

White process of tool steel. The company are just commencing to manufacture tools specially required by railroads, such as car wheel lathes, hydrostatic presses, boring mills, &c. Among orders recently taken are new specifications for machinery for the American Car & Foundry Company, the Allis-Chalmers Engine Company, Milwaukee, Wis.; the American Locomotive Works, and the Columbia Engineering Works, Portland, Ore.

The Locke Machine Works, Bradford, Pa., which were entirely consumed by fire on June 29 last, have been rebuilt, the new building being a considerable improvement on the old. The works were started running December 1, and have been fully employed since then.

E. R. Caldwell & Co., Bradford, Pa., machinists and foundries, intend adding a new building to their works in the early spring. It will be 180 x 90 feet, and be entirely devoted to foundry work. The space occupied by the present foundry will be used for shipping rooms and storage. There will be installed in the new building a 20-ton electric crane and a new cupola that will melt from 10 to 12 tons of iron an hour. The company chiefly manufacture oil well supplies, steam engines and hydraulic presses, but they are always open to estimate on manufacture of special machinery. They have for the last year and a half been kept busy all the time, and have actually had to decline work they had opportunity of securing.

The Tyrone Foundry & Machine Company, Tyrone, Pa., are making an addition to their foundry. They are now building the fifth rock crusher for the Duerr Contracting Company, Wilkes-Barre, Pa., and also one for the Empire Limestone Company, Scranton, Pa.

Jenkins & Lingle, Bellefonte, Pa., have for over a year had orders for their power hammer to the full extent of their manufacturing capacity. Among orders they have now on hand are the following for one hammer each: The Buffalo Spring & Gear Company, Buffalo, N. Y.; the Morse Drill Company, Plymouth, Pa.; the Iron City Tool Works, Pittsburgh, Pa.; the York Carriage Company, York, Pa., and the United Fruit Company, New York City. The Pennsylvania Railroad Company use their hammers so largely that it is seldom there is not one being built for them. In the export branch, a hammer is now being shipped to England. To meet the requirements of increasing business the company contemplate enlarging their plant in the near future.

The Royersford Foundry & Machine Company, Royersford, Pa., report a very active condition of business. Both the foundry and machine shops are being operated to their best capacity. Recent shipments of punches and shears include two for the Prentiss Tool & Supply Company, one No. 2 being for New York and one No. 3 for Pittsburgh delivery; one No. 3 combined machine has been shipped to the F. R. Patch Mfg. Company, Rutland, Vt., and another of the same size delivered to the Anderson Construction Company of New York.

The recently organized El Reno Light & Power Company, El Reno, Okla., are in the market for entire equipment for the new electric light plant they are to erect. They recently purchased the plant of the El Reno Electric Light & Telephone Company, which will be replaced by one of increased capacity. The officers are Henry Lassen, president; John A. Masters, secretary and manager, and C. M. Jackman, treasurer.

Boilers, Engines and Accessories.

The Hough-Brundage Company, Limited, Albion, Mich., recently incorporated, are building new shops, 44 x 100 feet, two stories, which will be equipped with latest improved machinery, made especially for them for the manufacture of engines. The product of the company will be gasoline engines from 2½ to 10 horse-power, a complete line of pulleys, hangers and shafting and the Hough pumping jack.

The Best Mfg. Company of Pittsburgh have about finished a very large amount of steam fitting work for Cuba. They have had men working on this contract for some months. They received some time ago a contract for a very large amount of steam and gas piping for the new open hearth steel plant of the St. Clair Steel Company, at Clairton, Pa. They also have some other large contracts and have enough work on hand to keep their large shops busy for several months. They are manufacturers of valves, castings, piping, and make a specialty of pipe bending.

The William Tod Company of Youngstown, Ohio, have recently taken contracts for the largest blooming engines ever built. One of these contracts is from the Youngstown Iron Sheet & Tube Company, and is for a 54 x 66 inch return crank reversing blooming mill engine, which will be used to drive the new blooming mill to be built by that concern in connection with their new open hearth steel plant. A second order received by the William Tod Company is from the Republic Iron & Steel Company, and is for a duplicate of the above engine, which will replace the present one in the blooming mill of the Bessemer plant of the Republic Iron & Steel Company, at Youngstown. These engines when completed and set up will weigh about 750,000 pounds. They will be the largest blooming mill engines in the world. The present largest one is the 55 x 60 inch engine in the Homestead Steel Works of the Carnegie Steel Company, at Homestead. The bed plates will each weigh 150,000 pounds, and the cylinders about 50,000 pounds. The crank shafts will

be steel forgings 26 inches in diameter and about 20 feet long. These engines will require nearly a year to build. The William Tod Company have a great deal of other work in their shops and are running their entire plant to utmost capacity and have work ahead for many months.

Deere & Company, Moline, Ill., manufacturers of plows, will install a new power plant, using two 500 horse-power vertical engines with direct connected generators.

Broderick & Quinlin, boiler makers and sheet iron workers, Montpelier, Ind., have incorporated their business under style of Broderick & Quinlin Mfg. Company. They have during the past four months enlarged their plant and installed new machinery.

The Buckeye Engine Company, Salem, Ohio, manufacturers of Buckeye automatic cut off engines, have sold through their Pittsburgh office to the Standard Steel Car Company of that city three 650 horse-power Buckeye engines. They have also received a contract for the National Mining Company for two 300 horse-power engines, to be direct connected to generators.

Foundries.

The St. Louis Iron & Steel Foundry Company, St. Louis, Mo., will rebuild their plant, which was recently destroyed by fire. The building was of brick, two stories, 150 x 175 feet, and the new one will be of about the same dimensions.

The Centre Foundry & Machine Company have been incorporated at Wheeling, W. Va., with a capital of \$50,000, and will operate a foundry.

The Penberthy Injector Company, Detroit, Mich., have plans ready for a foundry 36 x 60 feet, to be erected at Abbott street and Brooklyn avenue.

Carroll Brothers, Houghton, Mich., founders, will build a new foundry in the spring. All equipment has been purchased.

Bridges and Buildings.

The Virginia Bridge & Iron Company, Roanoke, Va., manufacturers of steel and iron bridges, have increased their capital stock from \$100,000 to \$200,000, for the purpose of taking care of their increasing business and for making some additions to their plant, plans for which are not yet prepared.

Fires.

Hopson-Haftencamp Company's plant at Grand Rapids, Mich., was destroyed by fire January 20. The loss is about \$45,000. The company manufacture tinners' and roofers' supplies.

The old Empire Stove Foundry, Troy, N. Y., was destroyed by fire January 28. The building was occupied by several firms, including the Mount Ida Nickel Works, and the Hislop Scale Works. The loss is about \$30,000; insurance \$25,000.

The Barrett Tar Paper Mfg. Company's plant at Shadyside, N. J., was destroyed by fire January 25. The loss is estimated at about \$100,000.

The plant of the Blazer Stove Polish Mfg. Company, Passaic, N. J., was last week destroyed by fire. The loss will reach \$15,000.

The Memphis Pump Company, Memphis, Tenn., suffered a \$20,000 loss by fire at their plant recently. The finishing room, office and recently built fining room with entire contents of machinery, finished pumps, &c., were destroyed.

The Pattern shops of the Philadelphia, Wilmington & Baltimore Railroad Company, at Wilmington, Del., were destroyed by fire January 27. The loss is estimated at \$50,000.

The foundry of Kelly & Tannehill, Waterloo, Iowa, was recently destroyed by fire. Loss is about \$5000.

The plant of the American Match Company, at Reading, Pa., was recently destroyed by fire. Loss \$25,000; fully insured.

Hardware.

Napier Saw Company, 10 Franklin Square, Rochester, N. Y., who were organized March 1 last, are manufacturers of hack saws, band saws, butcher saws, &c., a specialty being made of concave hack saws. They have just perfected and patented a power circular cutting saw for all kinds of metal and have commenced to manufacture it.

Chandler Wire Fence Company, Trenton, N. J., are considering the advisability of establishing a branch factory at Wheeling, W. Va.

The Wright & Colton Wire Cloth Company, Worcester, Mass., will increase their capital stock from \$250,000 to \$300,000 on account of the growth of the business. The plant was established 12 years ago with a capital of \$50,000.

The Charles Parker Company, Meriden, Conn., have leased the foundry of the Meriden Malleable Iron Works, which has been closed for several months. This action has been rendered necessary by the lack of capacity in their present foundry, and consequent delay in filling orders. It is the company's intention to begin running the leased premises about February 1, or as soon as they can get together a sufficient force of molders to advantageously operate it. Naturally the increased output in their foundry will give employment to others in various departments of the plant, and it is expected that from 75 to 100 hands will be added to the company's payroll on account of the increased product in castings.

The factory of the Indiana Shovel Company, New Castle, Ind., has come under the control of the Shovel Association, and H. A. Urban, Richmond, Ind.; Howard Rowland, Philadelphia; Charles Myers, Beaver Falls, Pa., and W. J. Alford, Anderson, Ind., have been elected directors. The minority stockholder has, however, applied to the courts to forfeit the charter and dissolve the company. A receiver has been appointed, who will operate the plant pending the litigation.

Miscellaneous.

The Economy Match Company will shortly be incorporated at Williamsport, Pa., with a capital stock of \$40,000, for the purpose of manufacturing match sticks and match stick machines, the invention of J. H. Stewart of that city. It is the intention of the company to sell rights to operate the machine to other companies, and to demonstrate its practicability they will at once erect a match factory, plans for which are now under way. The officers will be: J. H. Stewart, president; John S. Furst, secretary and treasurer.

For the protection of the Union railroad bridge which crosses the Monongahela River at Pittsburgh silica-graphite paint, manufactured by Joseph Dixon Crucible Company, was chosen. The engineers were Emil Swenson, designer and engineer of construction, and W. H. Smith, chief engineer of Carnegie Steel Company. The total weight of the bridge is 5135 tons, and it has a total length of 2328 feet. Designed for carrying molten metal from the Carrie furnace to the Homestead Steel Works and raw materials to the furnaces, this steel structure is subjected to heat from the molten metal, sulphur fumes from locomotives and river steamers, also from the adjoining furnaces and steel mills. Probably no steel bridge in the world is exposed to so many and severe destructive agencies.

The Norfolk & Western Railroad Company recently placed orders in their own shops for 1700 cars and also an order with the American Car & Foundry Company for 1000 cars.

It is expected that the buildings at Hammond, Ind., formerly used by the Corning Steel Company for the manufacture of sheets will be utilized for the building of cars. This property was purchased about two years since by the American Sheet Steel Company, who dismantled the works last summer and removed the machinery to their other plants. They have recently disposed of the ground and buildings to Torbert & Beckham, Monadnock Building, Chicago.

The Peckham Mfg. Company, 5 Howard street, Newark, N. J., are putting on the market prepared leather meal for dry barrel polishing, which they claim to be superior to scrap leather, sawdust, &c.

The Newton Steel Wheel Company have been organized at Kalamazoo, Mich., for the manufacture of steel wheels. The company have quite a number of orders on hand and expect to begin operations February 1.

The Onelda Rendering & Fertilizer Company, Onelda, N. Y., recently incorporated, are erecting a plant for the manufacture of Underwood's fertilizer.

As soon as weather will permit, the Lincoln Paint & Color Company will erect a large plant at Lincoln, N. J.

The Salem Foundry & Machine Shop, Salem, Mass., manufacturers of passenger and freight elevators, announce that they have changed their name to the Salem Elevator Works. They recently moved into their new quarters where they have increased facilities for the production of their line.

The United States Spring Bed Company, Springfield, Mass., manufacturers of woven wire mattresses, &c., will build an extension, 18 x 130 feet.

Sixty-seven thousand spindles and 1700 looms are required by the Whitman Mills Corporation, New Bedford, Mass., for the additions they are to make to their plant at a cost of about \$1,000,000. These will consist of a new spinning mill, 571 x 104 feet, three stories, and a weave shed, 384 x 303 feet, one story.

The Kenosha Mfg. Company have started a new enterprise at Kenosha, Wis., turning out sheet metal novelties, tools and steel dies. The prime movers in the company are Hudson F. Blackman and Walter E. Cristain.

The Fultonville Mfg. Company, Fultonville, N. Y., recently incorporated, have taken over the plant and business of J. A. Cross, manufacturer of hay carriers and special machines. The officers are R. A. Brace, president and manager; J. A. Cross, secretary and superintendent, and O. F. Canable, treasurer.

The Wonder Plow Company, St. Clair, Mich., have increased their capital stock from \$10,000 to \$250,000.

During the first week of this month the salesmen engineers of the Buffalo Forge Company, Buffalo, N. Y., gathered at the home office for the yearly week's conference and discussion. At the daily meetings several articles on heating and ventilating installations of different characters were read and discussed, after which a banquet was given at the Iroquois.

The Iron and Metal Trades.

From Cleveland comes the news that it has been found impossible to arrive at an understanding among the Ore mining companies with reference to non-Bessemer Ores for the coming season, the price of Bessemer Ores, however, having been established at \$4.25, Cleveland. It is reported that the independent mines at first asked that the leading Ore interest purchase 1,500,000 tons of Ore, which was refused because the interest in question proposes to mine all the Ore its smelting operations require. The proposal was then made that the largest interest abstain altogether from selling these grades of Ore, and this, too, was not deemed fair. The situation now is, therefore, that on non-Bessemer Ores there is no agreement as to prices, or as to tonnage, and that the market is an open one. We understand that good to choice Mesaba non-Bessemer Ores have sold lately at \$2.75 to \$3, lower lake ports.

The outcome of the negotiations does not, of course, mean that there is to be any war with a demoralization of prices. As a matter of fact, the failure to agree is due largely to the fact that one side was anxious to see prices advanced, while the other desired to keep values low. A good deal of Ore of this character has already been contracted for.

In the Pig Iron markets the demand from the foundries all over the country continues quite good, and prices have stiffened somewhat. One leading Southern interest is pronounced and emphatic in expressing the determination to prevent any further rise above the level now established, say \$12 for No. 2 Foundry Pig, at Birmingham. It is claimed that this price is adequately remunerative, and that by checking any further rise the interests of the trade will best be served.

There has been further heavy buying of Basic Pig Iron. In the Philadelphia district about 25,000 tons has been taken at \$15.90 to \$16.25, one new concern in Northern New York has purchased about 10,000 tons for the second half, two plants in the Wheeling district have secured about 14,000 tons of Virginia and Alabama Basic, and considerable quantities of Alabama Basic have been sold in the St. Louis and Chicago districts.

The scarcity of Steel continues, and is affording opportunities for further importations of foreign Billets and Slabs. A leading Canadian Steel plant, just started, has placed thus far about 12,000 tons of Open Hearth Steel Billets, of which about one-half is to go to the Pittsburgh district, and the other half to Eastern points. This Steel is selling at about \$27.50, delivered, for Standard Billets. Further sales of German Steel have been made, but advices from Europe indicate a firmer market.

In the Metal trade the leading sellers of Copper claim to have booked enormous orders, and have advanced prices quite rapidly during the past two or three days. It is evident that the pendulum had swung too far. The Lead smelters have pegged up that Metal a trifle. Reports as to consumption do not seem to justify this maneuver.

A Comparison of Prices.

At date, one week, one month and one year previous.

Advances Over the Previous Month in Heavy Type Declines in Italics.

PIG IRON:	1902. Jan. 29,	1902. Jan. 22,	1901. Jan. 1,	1901. Jan. 30,
Foundry Pig No. 2, Standard, Philadelphia	\$17.00	\$16.75	\$16.00	\$15.25
Foundry Pig No. 2, Southern, Cincinnati	14.75	14.75	14.25	13.25
Foundry Pig, No. 2, Local, Chicago	16.00	16.00	15.50	14.50
Bessemer Pig, Pittsburgh	16.75	16.75	16.75	13.25
Gray Forge, Pittsburgh	16.00	16.25	15.50	13.00
Lake Superior Charcoal, Chicago	19.50	19.50	18.50	18.50

BILLETS, RAILS, ETC.:

Steel Billets, Pittsburgh	28.50	27.50	27.00	19.75
Steel Billets, Philadelphia	29.50	29.50	29.00	21.00
Steel Billets, Chicago				20.75
Wire Rods, Pittsburgh	35.00	34.00	34.50	35.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
Spikes, Tidewater	2.00	2.00	2.00	1.50
Splice Bars, Tidewater	1.65	1.65	1.65	1.30

OLD MATERIAL:

O. Steel Rails, Chicago	15.00	14.75	14.00	12.00
O. Steel Rails, Philadelphia	18.50	18.50	18.00	15.50
O. Iron Rails, Chicago	22.00	21.00	21.00	18.00
O. Iron Rails, Philadelphia	21.00	21.00	21.50	18.00
O. Car Wheels, Chicago	16.50	16.50	16.00	16.50
O. Car Wheels, Philadelphia	17.00	17.00	16.75	17.00
Heavy Steel Scrap, Chicago	14.00	13.75	13.50	12.00

FINISHED IRON AND STEEL:

Refined Iron Bars, Philadelphia	1.67	1.67	1.65	1.40
Common Iron Bars, Chicago	1.75	1.65	1.65	1.45
Common Iron Bars, Youngstown	1.50	1.50	1.50	1.30
Steel Bars, Tidewater	1.62	1.67	1.70	1.38
Steel Bars, Pittsburgh	1.50	1.50	1.50	1.25
Tank Plates, Tidewater	1.78	1.78	1.78	1.55
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.40
Beams, Tidewater	1.75	1.75	1.75	1.63
Beams, Pittsburgh	1.60	1.60	1.60	1.50
Angles, Tidewater	1.75	1.75	1.75	1.53
Angles, Pittsburgh	1.60	1.60	1.60	1.40
Skelp, Grooved Iron, Pittsburgh	1.70	1.70	1.75	1.40
Skelp, Sheared Iron, Pittsburgh	1.75	1.75	1.80	1.50
Sheets, No. 27, Pittsburgh	3.00	2.90	2.90	2.85
Barb Wire, f.o.b. Pittsburgh	2.90	2.90	2.90	2.90
Wire Nails, f.o.b. Pittsburgh	2.00	2.00	1.95	2.30
Cut Nails, Mill	2.05	2.05	2.05	....

METALS:

Copper, New York	11.75	11.00	11.75	16.87½
Spelter, St. Louis	4.10	4.10	4.12½	3.80
Lead, New York	4.10	4.00	4.00	4.37½
Lead, St. Louis	4.00	3.90	3.95	4.15
Tin, New York	23.50	23.62½	23.50	26.25
Antimony, Hallett, New York	8.00	8.00	8.25	9.25
Nickel, New York	50.00	50.00	60.00	55.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	4.19	4.19	4.19	4.19

Chicago.

FISHER BUILDING, January 29, 1902.—(By Telegraph.)

The market not only maintains its strength, but shows a decided disposition to advance. This tendency is strongly opposed by many manufacturers who would apparently be benefited by higher prices, but are of the opinion that values should, if possible, be maintained at their present level. The consumption, however, is so heavy that consumers themselves are almost forcing an upward movement by the premiums they are offering for many classes of products which are in exceedingly short supply.

Pig Iron.—Foundrymen are still buying very freely, both for forward delivery and for quick shipment wherever they can find a furnace company in position to make a promise. Spot Pig Iron is in as great demand as ever, showing that many foundries have light stocks. The Malleable foundrymen are not yet able to get all the Coke Iron they need, but are steadily making purchases of Charcoal Iron for this purpose. The market is being scoured for Gray Forge, with very little available this side of July. Basic Pig Iron is rapidly getting into the same shape as Gray Forge. Some round lots have recently been placed under contract for the second quarter and the Southern furnace companies are now asking an advance of 50c. with few of them able to promise any-

thing before July. The Iroquois Iron Company blew in their new furnace on Monday, and the product of this large stack will now be added to the local supply. This will relieve some of the company's customers, but will not improve the general situation, as the product has already been sold far into the future. The prospects are bright for another furnace to be erected in this vicinity in the near future. We quote as follows:

Lake Superior Charcoal.....	\$19.50 to \$20.50
Local Coke Foundry, No. 1.....	16.50 to 17.00
Local Coke Foundry, No. 2.....	16.00 to 16.50
Local Coke Foundry, No. 3.....	15.50 to 16.00
Local Scotch, No. 1.....	16.50 to 17.00
Ohio Strong Softeners, No. 1.....	19.50 to 20.00
Southern Silvery, according to Silicon.....	16.90 to 17.15
Southern Coke, No. 1.....	16.40 to 16.65
Southern Coke, No. 2.....	15.65 to 15.90
Southern Coke, No. 3.....	15.15 to 15.40
Southern Coke, No. 1 Soft.....	16.40 to 16.65
Southern Coke, No. 2 Soft.....	15.65 to 15.90
Foundry Forge.....	14.65 to 14.90
Southern Gray Forge.....	14.65 to 14.90
Southern Mottled.....	14.15 to 14.65
Southern Charcoal Softeners, according to Silicon.....	15.50 to 16.50
Tennessee Silicon Pig.....	17.15 to 17.65
Alabama and Georgia Car Wheel.....	20.65 to 21.65
Malleable Bessemer.....	17.50 to 18.00
Standard Bessemer.....	18.25 to 20.00
Jackson County and Kentucky Silvery, 8 per cent. Silicon.....	18.50 to 19.00

Bars.—Although the manufacturers of Bar Iron have been discouraging their customers recently, the demand continues heavy, and a great deal of additional business has been placed the past week. Consumers are now looking further ahead, and a good number are arranging for their supply for the last half of the year. The mills are pretty thoroughly sold up for the first half. Raw material being dearer, and costs having thus advanced considerably, the price of Bar Iron is now held at 1.75c. to 1.80c., Chicago, for mill shipments. It has for some time been impossible to secure any Soft Steel Bars at less than these figures, and the market can consequently be quoted on that basis. Angles are not in any better supply, and are quoted at 2c. and upward for mill shipments. Hoops are held at 2.10c. to 2.20c. Jobbers are having as large a volume of business as at any time in their experience, and are kept in hot water constantly by the difficulty they encounter in keeping their stocks in good condition. They quote small lots at 1.90c. to 2c. for Bars, and 2.40c. to 2.50c. for Hoops.

Structural Material.—The building reported last week took 1400 and not 14,000 tons as printed. A great many orders have been placed during the week, covering business from the building trade, car manufacturers, bridge builders and other consumers of Shapes. Included in this business was one building which will take 3000 tons. A very great deal of work in the building line awaits action of the City Council in removing the limit on the height of buildings. Favorable action is quite confidently expected. The local yards report their capacity still overtaxed in supplying the demand for small lots. Mill shipments are quoted as follows: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 1.75c. to 1.85c.; small lots of Beams and Channels from local yards are quoted at 2.25c.; Angles, 2c. rates; Tees, 2.05c.

Plates.—The Plate trade does not show as great activity as other branches of the Steel trade, but this is claimed to be due to the difficulty in securing Structural Material, with which so many Plates are now used. If the Structural mills were making better shipments the specifications for Plates would be entered much more freely. Jobbers report their trade of only moderate proportions. Prices are, however, firmly maintained. Mill shipments are quoted as follows: Tank Plate, ¼-inch and heavier, 1.75c. to 1.80c., Chicago; Flange, 1.85c. to 1.95c.; Marine, 1.95c. to 2.05c. Jobbers are selling small lots from store at 1.90c. to 2c. for Tank and 2.25c. for Flange, with the usual extras for heads, segments, lighter gauges, &c.

Sheets.—The inducements offered by independent mills are attracting buyers, and a great deal of contracting is being done for future delivery. This business is being stimulated to some extent by the belief that the independent mills will shortly advance their prices. Meanwhile prices made are having effect on quotations from store. Mill shipments of No. 27 Black Sheets are quoted at 3.05c. to 3.15c., Chicago, and small lots from store at

3.35c. to 3.45c., but reports of lower store rates are in circulation. Small lots of Galvanized are quoted in a regular way at 70 and 2½ to 70 and 5, but lower prices are also current on this class of Sheets.

Merchant Pipe.—The season for spring buying has not yet opened, and the competition among the independent mills is quite brisk for such business as is now coming up. The leading manufacturers have not changed their views and are maintaining prices, evidently believing that the market will correct itself as soon as the spring trade opens in force. Carload lots are now quoted as follows, random lengths: Black, ½ to ½ inch, 60 off; ¾ to 10 inches, 67 off; Galvanized, ½ to ½ inch, 47 off; ¾ to 6 inches, 55 off.

Boiler Tubes.—No suspicion is now current of any weakness in price, the market apparently being exceedingly firm. Quotations are as follows:

	Steel.	Iron.
2½ to 5 inches.....	57½	47½
1½ to 2½ inches.....	50	40
1 to 1½ inches.....	35	30
6 inches and larger.....	52½	45

Merchant Steel.—A stronger demand is springing up. Orders are somewhat larger, and deliveries on orders now booked are extending into the third quarter. Mill shipments, Chicago, are quoted as follows: Smooth Finished Machinery Steel, 2c. to 2.10c.; Smooth Finished Tire, 1.90c. to 2c.; Open Hearth Spring Steel, 2.30c. to 2.40c.; Toe Calk, 2.20c. to 2.35c.; Sleigh Shoe, 1.85c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 55 to 60 off in carload lots. Ordinary grades of Crucible Tool Steel are quoted 6½c. to 7c. for mill shipments; specials, 12c. upward.

Rails and Track Supplies.—The demand for Heavy Sections is so strong that orders are being transferred to other mills to enable the Western works to take further business. A large tonnage of new orders was thus arranged for during the past week. Light Rails are in continued strong demand, and the local mills are now sold up to April. Heavy Sections are quoted at \$28 and Light Sections at \$31 to \$35. Fastenings are quoted as follows: Splice Bars, 1.70c. to 1.80c.; Spikes, 2c. to 2.10c.; Track Bolts, with Hexagon Nuts, 2.90c. to 2.95c.; Square Nuts, 2.75c. to 2.80c.

Old Material.—Dealers report a good demand, with some stiffening of prices. Large consumers are supplying their wants by careful purchases, being desirous of keeping prices down to reasonable figures. The following are approximate quotations per gross ton:

Old Iron Rails.....	\$22.00 to \$22.50
Old Steel Rails, mixed lengths.....	15.00 to 15.25
Old Steel Rails, long lengths.....	21.00 to 21.50
Heavy Relaying Rails.....	27.00 to 28.00
Old Car Wheels.....	16.50 to 17.00
Heavy Melting Steel Scrap.....	14.00 to 14.50
Mixed Steel.....	11.50 to 12.00

The following quotations are per net ton:

Iron Fish Plates.....	\$17.00 to \$17.50
Iron Car Axles.....	21.00 to 22.00
Steel Car Axles.....	18.00 to 18.50
No. 1 Railroad Wrought.....	16.00 to 16.50
No. 2 Railroad Wrought.....	14.00 to 14.50
Shafting.....	16.00 to 16.50
No. 1 Dealers Forge.....	13.50 to 14.00
No. 1 Bushing and Wrought Pipe.....	11.50 to 12.00
Iron Axle Turnings.....	12.25 to 12.50
Soft Steel Axle Turnings.....	10.50 to 11.00
Machine Shop Turnings.....	11.00 to 11.50
Cast Boring.....	6.00 to 6.50
Mixed Boring, &c.....	5.75 to 6.00
No. 1 Bolders, cut.....	11.00 to 11.50
No. 2 Bolders, cut.....	10.00 to 10.50
Heavy Cast Scrap.....	12.00 to 12.50
Stove Plate and Light Cast Scrap.....	9.00 to 9.50
Railroad Malleable.....	12.50 to 13.00
Agricultural Malleable.....	11.50 to 12.00

Metals.—Copper has been in heavy demand since last report, the buying having been partly speculative and partly from the regular consuming trade. Large consumers have been placing contracts to cover their requirements for a great part of the year. The increased trade has had an effect on prices, and carload lots of Lake are now selling at 12c., and Casting brands at 11½c. Pig Lead has been advanced, Desilverized now being quoted at 4.05c., and Corroding at 4.15c. in 50-ton lots. Old Copper and Brass are in heavy demand, but dealers are holding for better prices. Heavy Cut Copper can easily be sold at about 10½c., and Copper Bottoms at 9c. Small lots of Pipe Lead are held at 3.75c., and Zinc at 3c.

Coke.—The supply is increasing, but the receipts seem to be absorbed by the trade as fast as they arrive. Spot

Coke still brings \$5.50 to \$6, Chicago. Contracts for future delivery are quoted at \$5.25 for the best 72-hour Connellsville Foundry Coke.

Philadelphia.

FORREST BUILDING, January 28, 1902.

The situation is probably a little more settled than during the earlier portion of the month. The advance in prices appears to be recognized as warranted by the changed conditions, and as a great deal of business has been placed, there will be less disposition to shop around in the hope of finding something cheaper. There is a possibility, of course, that further advances will be made, but the chances on that side are not any stronger than on the other, so that the market may be said to be nearer to normal conditions than it has been for several weeks past. Material for prompt shipment, however, is hard to get, but the situation is not sufficiently strong to permit of overconfidence, as a good many things might happen to cause a relapse. Nevertheless, for the time being, the feeling is more settled, and if nothing unforeseen occurs tolerably smooth sailing is expected for a while. The shortage of cars and locomotives in the West is said to be less stringent, but in this district it is more difficult than ever to secure either shipments or deliveries. Under these circumstances it is difficult to determine what the exact position would be if the ordinary facilities were available. To that extent, therefore, business is somewhat of an artificial character, but the fact that all the important consuming interests are working up to their fullest limits shows that there has been no recession, but the point for consideration is, whether prices would have advanced as they have if there had been no interruption in the Coke and transportation supply. The answer to that will doubtless be worked out a little later on.

Pig Iron.—Prices are now pretty generally accepted as being on a basis of \$17 to \$17.50 for No. 2 X Foundry for ordinary contracts. Prompt shipments may be 25c. or even 50c. more money, but the demand for deferred deliveries is less urgent than it was earlier in the month; business is, in fact, dropping back into its ordinary channels at an established advance during the month of \$1 to \$1.50 per ton. This is a good beginning, and if prices can be kept within touch of to-day's quotations there is a fair chance for an excellent trade for months to come. Further advances, it is believed, would do more harm than good, and the strongest interests are doing their utmost to prevent speculative operations. Mill Irons are irregular; in some cases very extreme figures have been paid for prompt shipments, and there are some orders of the same character still waiting acceptance. Low grade Foundry Irons would also find a ready market at relatively high prices, but the offerings are unusually light. The scarcity seems to be the greatest at points some distance from the seaboard, local concerns being fairly well supplied. Bessemer Iron is very scarce, and commands full prices. Basic is possibly a little easier, one lot amounting to nearly 20,000 tons having been secured for the year's delivery at a special rate, but prompt shipments are subject to premiums of more or less importance. The range of prices would be about as follows for Philadelphia and nearby deliveries: No. 1 X Foundry, \$18 to \$18.50; No. 2 X Foundry, \$17 to \$17.75; No. 2 Plain, \$16.50 to \$16.75; Standard Gray Forge, \$16 to \$16.25; Ordinary Gray Forge, \$15.25 to \$15.75; Basic (Chilled), \$16 to \$16.50; Bessemer, \$19 to \$19.50.

Billets.—A fair amount of business has been done at \$30 for shipments covering the first half of the year, but there is still great difficulty in securing prompt shipments. Some business has been done in foreign Steel, and more is under negotiation, but it is difficult to quote exact figures, although \$28 would probably be a pretty close guess.

Plates.—There is more disposition to place orders, consumers being under the impression that the advancing tendency in other specialties will soon be manifested in Plates. A large amount of business has been entered from all sorts of consumers, the incomings for the week

being considerably in excess of the outgoings. Prices for Philadelphia and nearby deliveries are as follows: Universals, 1.75c. to 1.80c.; Sheared, 1.75c. to 1.80c.; Flange, 1.85c. to 1.95c.; Fire Box, 1.95c. to 2.05c.; Marine, 1.95c. to 2.05c.; C. H. No. 1 Iron, 2.40c.; C. H. No. 2 Flange, 2.90c.; C. H. No. 1 Flange Fire Box, 3.40c.

Structural Material.—The scarcity of Angles is beginning to be very serious, but the mills are absolutely unable to take care of all the business that comes before them, even when premiums are bid to secure prompt attention. The demand for everything required for structural purposes shows no abatement, however, and while prices are nominally unchanged, there is no certainty of orders being accepted, unless at a premium or subject to long delay in deliveries. Nominal quotations are as follows for seaboard or nearby deliveries: Angles, 1.75c. to 1.85c.; Beams and Channels, 15-inch and upward, 1.75c. to 1.85c.

Bars.—There is a good demand, and mills are kept well employed, but there is no difficulty in getting fairly prompt deliveries. Steel Bars have been harder to get on account of prices being relatively lower than for Iron Bars. It is expected, however, that Steel Bars will be advanced so as to correspond with the advance in other lines. Prices are about as follows: Iron Bars, 1.67c. to 1.72c., delivered; Steel, 1.62c. to 1.67c.

Sheets.—There is a fair demand for Sheets, but prices are weak, and under sharp competition some very low figures have been accepted, when the order was large enough to make it an object. Prices for small lots of best Sheets are about as follows, carload lots 10c. to 15c. less: No. 10, 2.40c. to 2.50c.; No. 14, 2.60c.; Nos. 16 and 17, 3c.; Nos. 18-21, 3.10c.; Nos. 26, 27, 3.30c. to 3.40c.; No. 28, 3.50c.

Old Material.—There is no material change from last week, although prices fluctuate considerably, partly due to the difference in cost of delivery, and in part to the necessity for securing immediate deliveries. Bids and offers are about as follows for deliveries in buyers' yards: Low Phosphorus Scrap, \$22 to \$24; Choice Railroad Scrap, \$20 to \$21; Light (Ordinary), \$13 to \$14; Light (Forge), \$15 to \$16; Machinery Cast, \$14.75 to \$15.25; Heavy Steel, \$18.50 to \$19; Old Steel Rails (short lengths), \$18.50 to \$19; Old Iron Rails, \$21 to \$22; Wrought Turnings, \$13 to \$13.50; Choice Heavy, \$14 to \$15; Cast Borings, \$8 to \$8.50; Old Car Wheels, \$17 to \$17.50; Iron Axles, \$24.50 to \$25.50.

Cleveland.

CLEVELAND, OHIO, January 28, 1902.

Iron Ore.—A meeting of the Ore Association was held during the week just past, and it was determined to continue the quotation of \$4.25 as the base price of Ore, the Bessemer Old Range being the basing Ore. This was entirely within keeping of expectations. The failure, however, to come to an understanding as to the price and production of other Ores was a little surprising. It was expected that an agreement upon the price of non-Bessemer and the Mesaba Ores would be reached, which would also enable the association to scale the estimates of the different mining companies that the market might not be flooded during the year. For some reason the Ore men could not agree upon the prices of the Old Range non-Bessemer and the Mesaba Ores, and they are to be marketed this year under exactly the same conditions as prevailed a year ago. The production of other than Old Range Bessemer Ore this year, therefore, will depend upon the market and the ability of lake boats and lake docks to handle the output. The struggle for an advantage in making sales will likely be sharper than it otherwise would be in the absence of any agreement as to the amount to be produced. Some of the advance sales of all grades of Ore had a certain influence upon the action of the association. As these sales indicated, and as the association seemed inclined, the price of non-Bessemer Old Range and Bessemer Mesaba will be about \$3.25, and non-Bessemer Mesaba will be about \$2.75. Nothing has been done as yet looking toward the establishment of the rate of carriage for the Ores, and it may be two

weeks or even more before any action is taken. The Ore market was opened on Monday, and some big inquiries were at once made for the product. It is expected that last year's action will be duplicated this season, in that most of the season's Ore will be contracted for at the beginning, or within a couple of weeks following the opening of the market. It is difficult at this time to get at the exact amount of Ore sold, to date, but it is known that inquiries aggregating a considerable amount have been received by the big companies. The estimates prepared by the Bessemer Association indicate that they will produce this year between 3,500,000 and 4,000,000 tons, while it is expected that the total production of Ore will be about 23,000,000 to 23,500,000 tons during the year, or about 1,000,000 or a little better in excess of what it was during the past year. At the meeting last week W. G. Mather, the president of the Cleveland Cliffs Iron Company, was made the president of the organization.

Pig Iron.—The market as to Foundry grades is in a peculiarly distressing condition for some of the consumers. Most of the Iron available for the remainder of the first half, and, in fact, for the next six months, has been sold up. Many of the consumers, however, failed to cover all of their needs earlier, and are approaching March 1 with the knowledge that their present supply will about be exhausted. They are depending upon the open market to tide them over until June 1. Many of the smaller consumers, who are compelled to buy on the hand to mouth order, are without Iron, and are depending on carload or 100-ton lots with which to meet their requirements. Such dribbles as these are very hard to find now. In fact, most of the Foundry producers are announcing now that their stock piles have entirely disappeared, especially in the Valleys, and as the foundries have no stock piles of their own the situation is particularly bare, and the movement is direct from the furnace to the foundry, and most times to the cupola. The Coke supply is a little better, and all of the furnaces in the Valleys are now starting up, two only remaining banked. The car situation promises better results in the near future. Yet with these brighter conditions, it is evident that it will require three months at least before normal conditions have been restored, even should no accidents occur nor any furnace stop to be relined. Prices are stable at \$16.50 and \$16 respectively on Nos. 1 and 2 in the Valley. Basic Iron is in better demand than it has been, with prospects immediately ahead for some big sales covering deliveries during the second quarter at \$15.75 in the Valley. No large contracts for that period have been closed recently. Bessemer is pretty well sold up for the remainder of the first half at \$15.75 in the Valley. It is quite evident, however, that neither Bessemer nor Basic is quite equal, in amount available, to the demand of the market, inquiries being in excess of possible production. The greatest effort is now being made to maintain a stable list of prices. On Southern Foundry Iron there is a good demand, although the supply available for this territory is not great. The Southern furnaces were not quite so seriously attacked by the car shortage and Coke famine as those in the North, but the recent demands of this section have about taken up any surplus of Iron. The quotation of No. 2 is continued at \$12, Birmingham.

Finished Material.—The market this week shows a continuation of healthy conditions, and, in fact, the robustness of the trade has caused the producers some concern. In Structural Steel, for instance, it is a question as to how they are to pull through the spring demand. At a time when orders are generally being solicited vigorously the mills are compelled to put their best customers off, being able to offer nothing better than four months on deliveries. Besides this, it is known that there is a spring boom on this year in the building trade and the major portion of the Steel that will be needed has not been contracted for. All of this coming upon the market early in March is likely to congest things. The mills, in fact, say that they are uncomfortably well sold up. Making no allowance for possible cancellations and failures of projects, the Steel men now have enough orders to keep their plants going

for six months. The price does not change from 1.70c. Bars are looking up, and notwithstanding the many denials lately that there is any intention to advance the price, one such increase is an immediate possibility. The buyers this week have heard rumors of that sort and are acting accordingly. This is one way of accounting for the extraordinary tonnage that has been offered to the mills. The Bar situation has changed greatly during the last week or so. Formerly it was about a stand off between production and buying, but lately the mills have taken on enough orders to put them in a most comfortable situation for some time to come. The last two weeks, in fact, have seen a large Bar tonnage placed. In the absence of any advanced quotation the old price of 1.50c., Pittsburgh, for Bar Iron and Bessemer Steel Bars is quoted, and 1.60c., Pittsburgh, for Open Hearth Steel Bars. Plates are doing very well. The Universal mills are announcing that shipments are possible only in four months, while Sheared Plate mills are so well sold up that they have nothing to offer inside of 30 days. The price does not change from 1.70c., and there is hardly a possibility that it will be changed soon. Steel Rails are hanging on to the old quotation of \$28, but the market has not showed any great activity of late. The heavy advance ordering seems to have about taken care of the railroads, although some are still coming upon the market with a demand for some material. Billets are off the board altogether. No price has been quoted for the last three months and the mills say they have none to sell. Some of those who have been using German Billets in this territory are also making the announcement that the supply there is beginning to fall short, due to better conditions in the German market. Sheets are in increasingly better demand and some of the gauges are getting scarce. The price holds at 3.35c. to 3.50c. out of store for No. 27 one pass cold rolled, with 10c. extra on full cold rolled. Mill sales are light.

Old Material.—The dealers this week have been making an effort to advance some of the prices, but have failed through a lack of any unanimity of action among themselves. The buying has been rather brisk and the conditions seemed to warrant a better price, especially as the dealers are having to pay more for their material than formerly. The market, however, is off color as to prices and the old quotations prevail. They are: No. 1 Wrought, \$16 net; Cast Borings, \$8 gross; Wrought Turnings, \$12.25 gross; Cast Scrap, \$13 net; Stove Plate, \$10 net; Heavy Steel, \$17 gross; Old Iron Rails, \$22 gross; Steel Rails, \$17 gross; Old Iron Axles, \$22 gross; Old Car Wheels, \$17 gross.

The Ore Prices.

(By Telegraph.)

CLEVELAND, OHIO, January 28, 1902.—The Ore Association has just concluded its annual meeting, called to fix the prices on the product for the season and also, if possible, to regulate the production to suit the demands of the trade. During the preliminary discussion it was deemed advisable to appoint a committee to investigate the possibility of coming to an agreement as to the price of non-Bessemer Old Range and Bessemer and non-Bessemer Mesaba Ores. When it came to the meeting of the Ore Association proper, at which this committee made its report, it was recommended that the effort be abandoned for this year. Prior to this time some of the independent furnacemen in the Valleys, fearing that their supply of Ore was to be cut short by the encroachments of the Steel Corporation, went into the market and bought of some of the independent Ore mining concerns large quantities of Ore, entailing deliveries for the next ten years. This fact was responsible for the report that some antagonism has sprung up between the independent Ore producers and the Ore department of the United States Steel Corporation, which had resulted directly in the failure to agree upon prices and tonnage of the non-Bessemer and Mesaba Ores. The latter action, however, is the outgrowth of other conditions and has more reference to territorial divisions than to unfriendly relations among big concerns. The effort to come to an understanding as to the price of

non-Bessemer Old Range and the Mesaba Ores has been made periodically for years.

The committee which investigated the question during the last few weeks found that the district which is controlled by the Ore Association does not produce a sufficiently large per cent. of the Ore marketed in this country to permit it to take an arbitrary stand upon the question of prices or of tonnage, however attractive such a stand might be. Other Ore producing fields which are not controlled by such gigantic organizations as predominate in the Lake Superior district, and the interests of which are diametrically opposed to the lake Ore fields, are nearer to the Eastern markets and, of course, have the advantage of freight rates. They have a similar advantage in facilities for the movement of this Ore from the mines to the furnace stock piles. Some have also advantages as to the quality of the Ore produced, with reference to the peculiar needs of the furnace which they supply. As the tonnage produced by these opposing mines is sufficient to make them a factor upon the market, it is impossible for the lake Ore producers to legislate rates and conditions independent of the other producers. This explanation, therefore, of the failure to come to an agreement upon prices and tonnage is considered more reasonable than that which has to do with unfriendly relations between the various interests in the lake field, which would carry with it charges of prostituting business for vindictive purposes.

Regardless of the failure to agree to the extent of forming an association similar to that existing upon the production of Bessemer Old Range Ore, as to prices and tonnage of non-Bessemer Ores, the lake Ore men have so far come to an understanding that, while production is practically unlimited as far as an agreement is concerned, they are nevertheless holding for advances in prices. Non-Bessemer Mesaba Ores are bringing from 35c to 50c. a ton better than they did a year ago, and Bessemer Mesaba is bringing 35c. higher than during 1901. Old Range non-Bessemer Ore is also quoted up 25c., and the producers are refusing to accept anything less than these figures. Whether they will make any concessions from these prices when they come into competition with mines that are nearer the market remains to be seen, but at present they are firm in their position.

Pittsburgh.

HAMILTON BUILDING, January 29, 1902.—(By Telegraph.)

Pig Iron.—When it is considered that the United States made last year nearly 16,000,000 tons of Pig Iron and that unsold stocks at the furnaces on January 1 were less than 75,000 tons, a very clear conception can be had of the enormous consumption that is going on, and also shows very clearly the serious results that would attend even a temporary shut down of some of the furnaces from strikes, accidents or other causes. It also shows that were it not for the control of the market held by the large interests we would have skyrocket prices on Pig Iron, which in the end might prove disastrous. So far this month there have been made sales of about 185,000 tons of Standard Bessemer Iron by the Furnace Association and other interests. The condition now is that the furnaceman is not in shape to advance the price of Iron, as he has very little, if any, to sell. This Iron was sold at prices ranging all the way from \$15.75 to \$16.50 at the furnaces. The market on Bessemer Iron to-day is \$16 to \$16.50, some good sized lots having been sold at the lower price. There are reports that much higher prices have been paid for Bessemer Iron, but these were for small stray lots that do not cut any figure in the market. Gray Forge Iron is very strong at \$15.25 to \$15.50 at the furnace, or \$16 to \$16.25, Pittsburgh. There have been heavy sales of Foundry Iron for the third quarter and the market is very firm. We quote Standard Bessemer Iron at \$16 to \$16.50, at furnace; Gray Forge, \$16 to \$16.25; No. 2 Foundry, \$16.50 to \$16.75, and No. 1, \$17 to \$17.25, all f.o.b. cars Pittsburgh.

Billets.—Steel is scarcer and harder to get than at any time for months, and \$28.50 to \$29, maker's mill, is readily paid for small lots. Basic Billets for prompt delivery are reported to have been sold at \$30, maker's

mill. Some Nova Scotia Steel has recently been sold for delivery in the Pittsburgh district at about \$27.50, delivered.

(By Mail.)

There is a greater scarcity of Steel now than at any time in the past year, and consumers who have not covered are scouring the market in every direction trying to find Steel, and with but little success. Prompt Billets would readily bring \$30, and this price has been offered without getting them. Taking Billets as a basis, prices of Finished Material, such as Plates, Beams and Channels, Bars, Sheets and Steel Skelp, ought to be higher, and it is not unlikely that prices on Material that are fixed by agreement will be advanced at an early date. It is true that some of the larger interests, notably United States Steel Corporation, Jones & Laughlins, Limited, and others, are opposed to higher prices, arguing that if the market can be held where it is now it will be better for all concerned. However, the situation seems to be that there is demand for more material of all kinds than the blast furnaces and Steel mills can turn out, and it is a demand that is getting larger right along. The market is in that shape that it is liable to run away with itself and prices be much higher in a short time. In Pig Iron the situation is that the furnaces in the Central West and in other sections of the country as well have their entire product sold up to July or longer, and Iron for prompt shipment is bringing a premium of \$1 a ton or more. The condition of the Steel market is fully set forth above. The small concerns who have to buy Billets at present high prices cannot put them into Bars, Rods and other material and come out even. There is a very heavy demand for nearly all kinds of Finished Iron and Steel, about the only exceptions being Plates, Steel Skelp and Merchant Pipe. A much higher Iron market all around in the next week or two would not be surprising to those who are in close touch with the situation.

Spelter.—We quote prime Western grades of Spelter at 4.20c., Pittsburgh, and note a sale of 25 tons at that price.

Muck Bar.—There is nothing of special interest to note. Demand is quiet and prices do not improve any. We quote standard grades of Muck Bar at \$28.75 to \$29, Pittsburgh. We are not advised of any recent sales.

Rods.—Prices on Rods are much higher, and we quote ordinary Bessemer Rods at \$35, maker's mill. A leading mill has retired from the market, being sold up for some months.

Ferromanganese.—We quote foreign 80 per cent. Ferro at \$50, in large lots, delivered at buyer's mill. Domestic Ferro is held at \$52.50 to \$53.50, depending on the tonnage and deliveries wanted.

Iron and Steel Bars.—The leading makers of Steel Bars met in the Duquesne Club to-day. Carnegie Steel Company, Crucible Steel Company, Jones & Laughlins, Limited; American Steel Hoop Company, Cambria Steel Company and Republic Iron & Steel Company were all represented in person. Reports made by those present showed that tonnage in Steel Bars is exceedingly heavy and the mills are crowded with work. Consumers who bought some time since, when prices were lower, have completed their contracts and are again placing large orders at 1.50c. at mill, which is the absolute minimum of the market. Some of the smaller mills were in favor of advancing prices on Steel Bars \$2 a ton, but after a careful review of the situation it was decided not to do this, and the price remains at 1.50c., minimum, half extras, for Bessemer Steel Bars and 1.60c., half extras, for Basic. However, a good deal of tonnage in Bars is being sold at 1.60c. at mill and higher for prompt shipment. We quote Iron Bars at 1.50c. to 1.60c., at mill. Steel Hoops are 1.90c., base, in carloads, and up to 2.25c. in small lots.

Plates.—There is nothing of special interest to note in the Plate trade. The leading mills are pretty comfortably filled, but so much new Plate capacity has come on the market in the last year that it takes an enormous tonnage to keep all the Plate mills filled with work. There is a good current demand and the question of an advance in the price of Plates, owing to high prices of Steel, is again being agitated by some of the

mills. However, some of the larger mills are opposed to higher prices, and it is hardly likely an advance will be made in the near future, at least, or until tonnage is heavier than it is now. We quote: Tank Plate, ¼ inch thick and up to 100 inches in width, 1.60c. at mill, Pittsburgh: Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price to 3c. Plate more than 100 inches wide, 5c. extra per 100 lbs. Plate 3-16 inch in thickness, \$2 extra; gauges Nos. 7 and 8, \$3 extra; No. 9, \$5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms, net cash in 30 days. Small lots of Plates from store are sold on the basis of 1.70c. to 1.75c. for Tank, with the usual advances for the higher grades.

Structural Material.—The fact that the leading Bridge interest has work enough ahead for eight months gives a pretty clear idea of the enormous tonnage that is being placed with the Structural mills. A good deal of local work, tonnage for which was placed some time since, will soon be started. Small lots of Beams and other Material from stock readily bring 25c. per 100 pounds and even more over association prices. We quote: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6 inches, 1.60c.; smaller sizes, 1.55c. to 1.60c.; Zees, 1.60c.; Tees, 1.65c.; Steel Bars, 1.50c., half extras, at mill; Universal and Sheared Plates, 1.60c. All above prices are f.o.b. Pittsburgh. Small lots of Shapes for prompt shipment bring from \$3 to \$5 a ton or more higher prices than the above. As noted, small lots of Structural Shapes are sold on the basis of 1.85c. to 2c. for Beams.

Sheets.—The condition of the Sheet market is very satisfactory to the mills, all of which are well filled up for the next 60 days or longer. The meeting of the Sheet mills to be held in this city, Monday, February 3, is awaited with a good deal of interest. The matter of a source of supply for Sheet Bars will be actively taken up, and there is talk of some of the independent mills going together and building an Open Hearth Steel plant. Prices are very firm, and we quote No. 27 Black Sheets, Box Annealed, one pass through cold rolls, at 3c. to 3.10c., and No. 28 at 3.05c. to 3.15c., depending on the tonnage. Prices on Galvanized Sheets are also very firm, and we quote at 70 and 10 in carloads, and 70 off in small lots, all f.o.b. cars, maker's mill. Jobbers get higher prices than these for small lots from stock.

Merchant Steel.—We note a very much improved market for Shafting and the absolute minimum of the market is 60 off, with some makers holding at 55 off in carloads, and 50 per cent. off in small lots. These are delivered prices at any point east of the Mississippi River. Tire Steel is 1.70c. to 1.75c.; Toe Calk, best quality, is 1.95c. to 2.05c.; Open Hearth Spring, best quality, 2.50c. to 2.60c.; Hammered Lay Steel, 3.75c. to 4c.; Ordinary Sleigh Shoe, 2c. to 2.25c.; Sleigh Shoes, tapered and bent, 2.75c.; Tool Steel, 6½c. and upward. On Tool Steel freight is allowed to points east of the Mississippi River.

Iron and Steel Skelp.—There is little, if any, improvement in demand, and while prices are a little firmer in tone, they are not any higher. We quote Grooved Iron Skelp 1.72½c. to 1.75c., and Sheared 1.80c. to 1.85c., delivered at buyer's mill. On Steel Skelp higher prices are quoted, owing to scarcity of Billets.

Merchant Pipe.—There is a fair demand for Merchant Pipe, but a good deal of unevenness in prices, some of the new mills quoting low figures to secure tonnage. For small lots jobbers quote about as follows:

Merchant Pipe.		Black.	Galvd.
		Per cent.	Per cent.
¼ to ¾ inch and 11 to 12 inch.....		61	48
¾ to 10 inch.....		68½	56
Casing, Random Lengths.			
2 to 3 inch.....	S. & S.	58	I. J.
3¼ to 4 inch.....		63	59
4¼ to 12½ inch.....		65	61½
Casing, Out Lengths.			
2 to 3 inch.....	S. & S.	58½	I. J.
3¼ to 4 inch.....		59	55
4¼ to 12½ inch.....		61½	57½

Prices named by the mills to the jobbers are somewhat lower than the above.

Boiler Tubes.—There is a heavy demand, and the mills and jobbers are holding prices very firm. Small lots are quoted by jobbers as follows:

Boiler Tubes.		Up to 22 feet.
Steel.		Per cent.
1 inch to 1¾ inch and 2¾ inch to 5 inch, inclusive...		65½
2 inch to 2½ inch, inclusive.....		60
6 inch and larger.....		59
Iron.		
1 inch to 1½ inch and 2¼ inch.....		43½
1½ to 2¼ inch.....		43
2½ to 13 inch.....		53

Iron and Steel Scrap.—Large consumers are using every effort to hold prices down, and are delaying placing contracts as much as possible. However, the Scrap market is very firm, dealers who have stocks either refusing to quote or else naming high prices. We quote No. 1 Wrought Scrap at \$16.50 to \$17 net ton; Old Iron Rails, \$22 to \$23 gross ton; Heavy Melting Stock, \$17.50 to \$18 gross ton.

Connellsville Coke.—Car service in the Connellsville region still continues very unsatisfactory and serves to keep Coke scarce and high in price. The figures of the *Courier* give the output in the Connellsville region last week as 207,420 tons, and shipments 11,277 cars. We continue to quote strictly Connellsville Furnace Coke at \$2.25 a ton on contracts for delivery through this year and \$2.50 to \$3 a ton for prompt shipment. Seventy-two-hour Foundry Coke is \$2.75 to \$3 a ton on contracts and up to \$3.50 a ton for prompt delivery. Main Line Coke sells at slightly lower prices, depending on the brand.

Thomas A. Mack & Co. of Cincinnati, Pig Iron merchants, have opened an office at 601 Empire Building, Pittsburgh. The office will be under the supervision of B. A. Wallingford, Jr., assisted by O. W. Mason.

Goff, Horner & Co., Limited, Pittsburgh, have acquired an interest in the property of the Curtis Sheet Steel & Corrugating Company of Zanesville, Ohio, and at the same time have arranged that all the buying and selling of materials for the company shall be conducted through their offices at Pittsburgh. All contracts for both raw and finished material have been assumed and will be executed by Goff, Horner & Co., to whom all inquiries for the product of the mills should be sent. Black and Corrugated Sheets are now being manufactured and a galvanizing department is almost completed. Four mills are now in operation and another one will probably be added at once, when the plant will have an output of 1250 to 1500 tons per month of Black, Corrugated, Galvanized and fine grade Pickled and Cold Rolled Sheets.

St. Louis.

CHEMICAL BUILDING, January 29, 1902.—(By Telegraph).

Pig Iron.—We can report no new changes of note in the Pig Iron situation in this section. Stocks on hand have been gradually getting lower, and this week a much smaller available supply is reported. There is no dearth of good orders, and inquiries and a lively trade for immediate delivery would be in progress if only the materials could be supplied. The bulk of the business in hand is for delivery the first six months, but some bookings beyond these dates are heard. The price-list is without change. We quote as follows for cash, f.o.b. St. Louis:

Southern, No. 1 Foundry.....	\$15.75 to \$16.00
Southern, No. 2 Foundry.....	15.25 to 15.50
Southern, No. 3 Foundry.....	14.75 to 15.00
Southern, No. 4 Foundry.....	14.25 to 14.50
No. 1 Soft.....	15.75 to 16.00
No. 2 Soft.....	15.25 to 15.50
Gray Forge.....	14.25 to 14.50

Bars.—The market for Steel and Iron Bars is without change since our last report. It is still continuing its active course. Among the jobbers the same tone of conditions are said to rule. No advance has been announced by the jobbers on Iron Bars. We quote from mill Iron Bars at 1.80c.; Steel Bars at 2c. Jobbers quote Iron Bars at 2c., and Steel Bars at 2.10c., full extras.

Rails and Track Supplies.—The report from the Rail department of the market is along the same lines as noted last week, and no let up in the heavy demand and inquiry is indicated. Track Supplies share in the same conditions, and we are advised of no changes in the price-list. We quote: Splice Bars, 1.75c. to 1.95c.; Bolts, with Square Nuts, 2.75c. to 2.90c.; with Hexagon Nuts, 2.90c. to 2.95c.; Spikes, 2c. to 2½c.

Angles and Channels.—An active demand runs in the market for Small Angles and Channels, and jobbers express satisfaction with the order of affairs. Jobbers quote at 2.30c., base, for materials of this class.

Sheets.—A good active trade is being cared for in the market for Sheets of all grades and sizes, and no changes are to be noted in the list of prices. Jobbers quote at Stove Pipe size, No. 27, 3.45c. to 3.50c.; Galvanized Sheets, 65" and 10 off, and in round lots, 70 to 70 and 5 off.

Cincinnati.

FIFTH AND MAIN STS., January 29, 1902.—(By Telegraph.)

The Pig Iron market continues to show a very considerable degree of activity. There has been quite an amount of business booked for the third quarter of the year and no insignificant tonnage for the last quarter. Some sellers think they see a tendency to speculation on the part of the actual consumers in buying what seems to be more than their regular requirements would justify. The speculation as usually understood has not made its appearance, however. Agencies here are considering January just closing to be a record breaker, when the field at large is considered. Some very considerable lots of Basic Irons are reported placed last week on the basis of \$13.50, Birmingham. One seller reports a lot of 3000 tons of Southern Foundry sold in Chicago on the basis of \$12 for No. 2, Birmingham. There is no cessation of the complaint regarding car shortage north of the Ohio River. There is not much change in the price-list. Freight rate from the Hanging Rock district is \$1.10 and from Birmingham \$2.75. We quote, f.o.b. Cincinnati:

Southern Coke, No. 1.....	to \$15.25
Southern Coke, No. 2.....	to 14.75
Southern Coke, No. 3.....	to 14.25
Southern Coke, No. 4.....	to 13.75
Southern Coke, No. 1 Soft.....	to 15.25
Southern Coke, No. 2 Soft.....	to 14.75
Southern Coke, Gray Forge.....	to 13.75
Southern Coke, Mottled.....	to 13.75
Ohio Silvery, No. 1.....	\$16.25 to 16.75
Ohio Silvery, No. 2.....	15.75 to 16.25
Lake Superior Coke, No. 1.....	to 17.35
Lake Superior Coke, No. 2.....	to 16.85
Lake Superior Coke, No. 3.....	to 16.35
Southern Basic.....	to 16.25

Car Wheel and Malleable Irons.

Standard Southern Car Wheel, chilling grades.....	\$18.75 to \$19.25
Standard Southern Car Wheel, No. 2.....	17.75 to 18.25
Lake Superior Car Wheel and Malleable.....	18.50 to 19.00

Plates and Bars.—The market is very strong, and particularly active in large Bar transactions. Iron Bars have advanced \$2 per ton in carload lots. We quote, f.o.b. Cincinnati: Iron Bars, in carload lots, 1.72c., with half extras; same in small lots, 1.85c. to 1.90c., with full extras; Steel Bars, in carload lots, 1.65c. to 1.70c., with half extras; same in small lots, 1.85c. to 1.90c., with full extras; Angles, in carload lots, 2c.; Plates, ¼-inch and heavier, 1.90c. to 2c.; 3-16-inch, 2.10c.; Sheets, No. 16, 2.90c. to 3c.

Old Material.—No change to quote in the situation or price-list; market is strong and fairly active. We quote dealers' buying prices, f.o.b. Cincinnati: No. 1 Wrought Railroad Scrap, per net ton, \$15.25 to \$15.50; Cast Railroad and Machine Scrap, \$12.25 to \$12.75; Iron Axles, \$20.50 to \$21; Iron Rails, \$19.50 to \$20; Steel Rails, rolling mill lengths, \$15.75 to \$16; short lengths, \$13.75 to \$14; Car Wheels, \$16 to \$17. All prices except No. 1 Wrought on the basis of gross tons.

Edgar T. Ward & Sons of Boston, Mass., have issued a circular referring to tests made with Capital high speed steel manufactured by Seebohm & Dieckstaht of Sheffield.

New York.

NEW YORK, January 29, 1902.

Pig Iron.—The market is strong and the feeling is growing that later on there will be considerable trouble about deliveries. Local buyers have again taken fair amounts, the largest purchase being of one lot of 5000 tons by a Pipe foundry. There are reports of negotiations on the importation of foreign Hematite Pig, but at prices now prevailing in England and here nothing can be done except for the re-export trade, which is limited. Possibly business might be put through in Low Phosphorus Iron. We quote for Northern Irons: No. 1, \$17.15 to \$17.50; No. 2 X, \$16.65 to \$17; No. 2 Plain, \$16.15 to \$16.25; Gray Forge, \$15.50 to \$15.75; Tennessee and Alabama brands, No. 1 Foundry, \$16.25 to \$16.75; No. 2 Foundry, \$15.75 to \$16; No. 1 Soft, \$16.25 to \$16.75; No. 2 Soft, \$15.75 to \$16; No. 3 Foundry, \$15.25 to \$15.50; No. 4 Foundry, \$14.75 to \$15; Gray Forge, \$14.50 to \$14.75.

Steel Rails.—There is no news of interest, although there are rumors that the Steel Rail makers held a meeting lately. We understand that the Dominion Iron & Steel Company, in order to supply the Canadian trade before the great rail mill now under construction can be completed, is rushing up a 26-inch mill not specially equipped with labor saving devices, for temporary service. We continue to quote \$28 at Eastern mill, for Standard Sections.

Structural Material.—So far as can be learned, the contract for the power house of the Rapid Transit Company has not yet been awarded. Prices are quoted as follows at tidewater: Beams, Channels and Zees, 1.75c. to 1.80c.; Angles, 1.75c. to 1.80c.; Tees, 1.80c. to 1.85c.; Bulb Angles and Deck Beams, 2c.; Sheared Steel Plates are 1.78c. to 1.85c. for Tank, 1.90c. to 1.95c. for Flange, 2c. to 2.05c. for Fire Box. Charcoal Iron Plates are held at 2.40c. for C. H. No. 1, 2.90c. for Flange, and 3.40c. for Fire Box. Refined Bars are 1.65c.; Soft Steel Bars, 1.70c.

Metal Market.

NEW YORK, January 29, 1902.

Pig Tin.—At the beginning of the week under review the market advanced rapidly on spot prices, reaching as high as 24½c. on Friday last. Since then, however, values have receded somewhat and to-day's closing quotations were the lowest for the week. They were: Spot and January, 23.35c. to 23.55c. February, 23.30c. to 23.50c. March, 23.15c. to 23.30c. April, 22.75c. to 23.25c. May, 23c. sellers. The London market reached its highest point on Monday at £108. Since then the decline has been sharp, the closing prices to-day being: Spot, £106 12s. 6d.; futures, £103. Business in spot was not active, as consumers are buying sparingly. There was more doing in futures, however, at the low figures, owing to the free selling from the East. Arrivals so far this month are 2801 tons. Afloats amounted to 3030 tons. The Banca sale will be held at Holland to-morrow, 2500 tons being scheduled for the sale.

Copper.—It is claimed that a large business was done at the 11c. basis. The demand, it is said, was for consumptive and export account. During the latter portion of the week under review prices have mysteriously advanced with a steady movement. To-day the "official" figure is 11½c. for Spot Lake, 11¼c. for Electrolytic and 11½c. for Casting. These figures show an advance of ½c. over yesterday and ¾c. as compared with last week. It is reported in the trade that a New York bull element are at work and that the principal producers are supplying them with all the metal they want and helping the good work along. No one, however, wishes to assume any responsibility for the future, and talk of prices going right back to their former high level is universally scoffed at in the trade. The general belief is that a lower level of prices is to prevail, at least for a considerable time to come. The present movement, having the speculative earmarks, is not expected to endure any great length of time. On the New York Metal Exchange this afternoon there was some lively "bidding up" in progress. Spot Lake was bid 11.90c.; January, 11½c., and February and March, 11¼c. There was a

sale at sellers' auction at which 250,000 lbs. were sold at 12c. for February and March delivery. In London transactions for future delivery have been very heavy, and under this influence the market has advanced sharply. This advance is best illustrated by Best Selected, which climbed £3 10s. since last week. To-day's price was cabled £57 for Best Selected. London closing to-day for G. M. B.'s was as follows: Spot, £51 7s. 6d.; futures, £51 10s.

Pig Lead.—There was an advance of 10c. On Saturday the American Smelting & Refining Company sent out the new figure of 4.10c. for Desilverized, New York, and 4.05c., St. Louis. Soft Missouri was quoted to-day 4c., St. Louis. In order to induce consumers to buy ahead of their immediate requirements, the American Smelting & Refining Company are to place an extra premium on spot. Notice to this effect was sent to the trade. On and after February 12 the quoted figure of the company will apply only to metal bought 15 days in advance of delivery. For strictly spot metal an extra charge of 2½ points will be added. The London market, which had advanced to £11 on Friday last, has since declined to £10 16s. 3d., which was the closing price to-day.

Spelter.—Was easier in tone, but unchanged as to price. Spot is quoted 4.27½c., and shipments from the West can be obtained at 4.25c. St. Louis is dull at 4.10c. London closed to-day £17 2s. 6d.

Antimony.—Is unchanged. Hallett's is quoted 8c. to 8¼c., Cookson's, 10¼c., and outside brands, 7½c.

Nickel.—Ton lots are quoted at 50c. The market is unchanged.

Quicksilver.—Prices are on a basis of \$48 per flask of 76½ lbs. in lots of 56 flasks or more.

Tin Plates.—The market is entirely unchanged. The American Tin Plate Company are quoting for delivery until July 1 on a basis of \$4.19 per box of standard 100-lb. Cokes, f.o.b. New York, or \$4 f.o.b. Pittsburgh district. The London market was quoted 12 shillings 6 pence.

To Celebrate America's Coal Centennial.

The citizens of Wilkes-Barre, Pa., have decided to celebrate the one hundredth anniversary of the day coal was first burned in this country. This was on February 11, 1802. The grate in which it was fired is still in existence. The attempt was made at an old log tavern kept by Jesse, Fell, at Wilkes-Barre, and later used as the County Court room. The winter was severe, and rumors having reached the town that the "black rock," which was about the town in plenty, was a fuel and gave good heat, it was decided to try it. A grate was built, and most of the notable persons in the town assembled at the tavern to see the attempt. The grate has since been carefully preserved in the house where it first held coal. It was the center of much attraction at the Centennial Exposition in Philadelphia in 1876, and was stolen at the closing of the exhibition. Detectives recovered it after weeks of search. Later it was stolen again, and was again recovered.

Arthur Keen Buys Nettlefolds.—Cable dispatches announce that Gurst, Keen & Co., at the head of which is Arthur Keen of Birmingham, have just purchased the famous works of Nettlefolds, Limited, of Birmingham, England, the largest manufacturers of screws in the world. This is the firm, formerly Nettlefolds & Chamberlain, of whom Joseph Chamberlain, the Colonial Secretary, was for many years a member. Nettlefolds a few years ago bought the plant erected at Leeds by the American Screw Company.

At Pittsburgh a bill in equity was filed last week by Dr. J. G. Connell, R. D. Brent and the American Gas Construction & Mfg. Company against Theodore R. Miller to restrain the defendant from withdrawing his application for certain letters patent and from disposing of the application to any person or persons than the plaintiffs. It was alleged Miller, Connell and Brent

agreed to organize a company to construct gas plants under two patents held by Miller, with a capital stock of \$300,000. It is claimed Miller was to receive expenses, that he was to have a situation and a controlling interest, while his partners were to furnish the money. The company, it is alleged, were formed with a capital of but \$1000, after which Miller refused to turn over the application for letters patent. The plaintiffs say they requested Miller to carry out his part of the agreement, or assign the application and patents to a trustee, which he refused to do. It is also stated it is feared Miller will turn the letters patent over to the W. J. McClurg Gas Construction Company, and that he has taken this stand because the company were capitalized at \$1000 instead of \$300,000.

Trade Publications.

Cylindrical Electric Copier.—A circular from the Pittsburgh Blue Print Company of Pittsburgh describes their cylindrical electric copier. This consists of a plate glass cylinder mounted either vertically or horizontally, as may be desired, and upon the outside of which the copy and copying paper are placed. Within this is placed an electric lamp of special design to give a uniform intensity of light throughout. Although the machines are made in regular sizes from 30 x 42 inches to 42 x 84, any desired size can be furnished.

Punching and Shearing Machines.—In our issue of January 2 last an error crept into our review of the catalogue of the Long & Allstatter Company of Hamilton, Ohio. Their address was given as Cincinnati, when it should have been as above, while the caption conveyed the impression that they built "boring" machinery, which is not a part of their product.

Grinding Machines and Magnetic Chucks.—Catalogue D by O. S. Walker & Co. of Worcester, Mass., describes their various types of surface grinders. In their automatic universal surface grinder the carriage is mounted upon a massive bed, which gives direct support to the carriage at all points of its movement. The cross feed slide runs on ample dovetailed bearings and is cast solid with the carriage. The machine has a two-part platen, consisting of a lower or sliding part and an upper or swiveling part, with a screw adjustment for tapers. The swiveling part is made in two styles, the dry top, with scale at the end graduated in inches per foot for tapers, and the wet top, for use with the water attachments. When so desired the machine is furnished entirely free from electrical devices, or it can be furnished entirely motor driven with automatic magnetic platen—i. e., a platen with magnetic chuck integral therewith in which the power goes off or on as the machine is stopped or started. One of the original features of the machine is the automatic dead stop, by means of which the machine takes care of itself after it is once adjusted and started, enabling the operator to perform other duties without the care of the grinder to divert attention. The grinding spindle has straight bearings and is mounted in bronze boxes (having positive and rigid adjustments) at the top of a vertical post of large diameter. The spindle is driven by a patented system, the belt entering the post at the center, passing around an idler pulley below, thence back over the spindle pulley, thence down to a still lower idler swiveling on the end of the vertical feed screw for the post. Thence the belt turns upward and leaves the machine through a separate opening. The lower idler being held from vertical movement, enables the spindle post to move and carry the spindle to any vertical position without affecting the belt tension. The rotary, surface, plain and swivel chucks are shown adapted for use on the company's surface grinders.

A small catalogue has been received from the E. W. Bliss Company of Brooklyn, N. Y., dealing with their presses, dies, shears and special machinery. While having a very complete line of standard machines, the company make a specialty of designing and manufacturing machinery for special purposes.

Exports of Iron, Steel, Metals and Machinery in 1901.

The Bureau of Statistics has just issued the December report of imports and exports, so that it is possible now to present final figures as to the export movement of iron, steel, metals and machinery.

For all the articles classified under iron and steel, to which reference will be made in detail, the value of exports was as follows, exclusive of iron ore:

Total Exports of Iron and Steel.	
1899.....	\$105,690,047
1900.....	129,633,480
1901.....	102,539,797

Turning to those articles for which quantities are given, we have the following figures:

Exports of Iron and Steel.			
	1899.	1900.	1901.
Iron ore, gross tons.....	40,665	51,460	64,703
Ferromanganese, gross tons....	13	32	.....
Pig iron, gross tons.....	228,665	286,783	81,178
Scrap, gross tons.....	76,633	47,283	14,199
Bar iron, net tons.....	12,206	14,879	19,832
Wire rods, net tons.....	19,031	11,930	9,143
All other bars or rods, net tons.	34,080	91,130	30,684
Billets and blooms, gross tons..	25,487	107,476	28,614
Hoop, band and scroll, net tons.	3,213	3,389	1,743
Iron rails, gross tons.....	6,442	5,374	901
Steel rails, gross tons.....	271,272	356,245	318,055
Iron plates, net tons.....	6,940	10,451	7,733
Steel plates, net tons.....	56,711	51,020	26,744
Tin plate, net tons.....	149	306	491
Structural iron and steel, gross tons	54,244	67,714	54,005
Wire, net tons.....	130,275	87,376	98,825
Cut nails, net tons.....	11,171	12,502	10,418
Wire nails, net tons.....	37,539	30,693	21,025
All other nails, including tacks, net tons.....	2,350	2,024	2,123

The following table summarizes the figures for which only values are given. It includes iron products, machinery and hardware:

Exports of Iron and Steel Products.			
	1899.	1900.	1901.
Car wheels.....	\$163,323	\$172,153	\$204,107
Castings, not elsewhere specified	1,348,746	1,498,985	1,247,697
Pipes and fittings.....	6,763,396	5,994,521	5,116,904
Stoves and ranges.....	524,324	566,978	656,177
Cash registers.....	.....	*860,622	931,984
Electrical machinery.....	3,145,838	5,286,224	5,623,442
Laundry machines.....	182,832	475,952	517,842
Metal working machines.....	6,840,924	6,210,594	3,003,871
Printing presses.....	1,037,644	1,295,379	790,559
Pumps and pumping machinery..	3,016,645	2,750,312	2,024,937
Shoe machinery.....	961,736	1,028,257	1,059,145
Fire engines	21,848	24,625	26,081
Locomotives	4,767,850	4,468,527	4,051,434
Stationary engines.....	494,930	873,509	861,864
Boilers and parts of engines.	1,439,363	1,855,398	1,495,972
Safts	164,710	121,657	134,990
Scales and balances.....	487,113	543,553	527,396
Locks, hinges and builders' hardware	5,464,913	6,067,658	5,207,379
Saws	231,837	311,317	325,141
Tools, not elsewhere specified..	3,246,782	3,403,427	3,303,639
Table cutlery.....	68,156	54,862	38,167
All other cutlery.....	184,000	212,574	205,452
Firearms	892,620	1,424,630	893,737
Sewing machines.....	4,103,828	4,510,220	3,749,334
Typewriting machines.....	2,776,863	2,736,435	2,937,762
All other machinery.....	19,721,191	23,852,046	18,665,182
All other manufactures of iron and steel.....	12,058,880	16,509,375	15,000,848

* Not separately stated until July 1, 1900.

Among the miscellaneous exports we find the following:

Exports of Miscellaneous Articles.			
	1899.	1900.	1901.
Agricultural implements....	\$13,594,524	\$15,979,909	\$16,714,308
Aluminum and manufactures	291,515	281,821	183,579
Fire brick.....	214,375	594,237	467,379
Cycles and parts.....	4,820,284	3,061,061	2,599,237
Cars	2,581,357	4,563,078	5,228,067
Clocks and watches.....	1,850,641	2,104,319	2,325,342
Copper, manufactures.....	1,852,499	2,257,563	1,842,336
Brass and manufactures...	1,607,072	2,068,072	2,078,178
Copper sulphate.....	1,302,420	2,052,989	2,251,436
Belting, hose and packing..	279,069	528,382	608,116
Oxide of zinc.....	366,598	496,380	393,259
Plated ware.....	493,528	518,988	501,394
Tin, manufactures.....	401,217	467,332	495,435

The exports of metals are exhibited in the following table:

Exports of Metals.

	1899.	1900.	1901.
Copper ore, tons.....	3,747	10,007	19,613
Copper ingots, net tons.....	143,413	169,061	97,124
Lead, net tons.....	47	997	2,342
Type, pounds.....	314,348	363,600	500,460
Nickel, oxide and matte, pounds.	5,004,377	5,870,206	5,869,655
Zinc ore, tons.....	24,197	37,555	39,425
Spelter, net tons.....	6,755	22,410	3,385

The East Coast Milling Company.

The East Coast Milling Company of Philadelphia, recently incorporated with a capital stock of \$2,000,000 preferred and \$7,000,000 common stock, have acquired control of the Eastern Milling & Export Company, as well as the Atlantic Flour Mills Company.

Among the directors elected are Samuel T. Kerr of Alex. Kerr Bros. & Co., Philadelphia, Pa.; C. H. Locher, president of the City Savings Fund & Trust Company, Lancaster, Pa.; H. C. Niles, vice-president of the Security Title & Trust Company of York, Pa.; Fredk. F. Culver of Clark & Culver, New York; P. Russ, president of the Carlisle & Mount Holly Railroad Company, Harrisburg, Pa.; A. J. Toomey, D. R. Locher and Chas. K. Hannan of the Eastern Milling & Export Company; H. G. Wolf of the Wolf Company, Chambersburg, Pa., and O. L. Cubelman of New Jersey.

The company will operate the 27 mills of the Eastern Milling & Export Company in connection with the new 5000-barrel mill that is now being built on the Philadelphia water front. The company own the ocean piers 31 and 32 on the Delaware River, on which they are about to erect a double deck steel superstructure in which will be located a blending plant that will be capable of turning out another 5000 barrels of flour a day, and will have a storage capacity of 200,000 barrels of flour, or other merchandise. Adjoining this will be erected a system of pneumatic steel storage tanks and elevator with a capacity of about 600,000 bushels of wheat.

The total capacity of the combined companies will be about 18,000 barrels daily. The capitalization is amply large to carry on their export as well as their domestic business. The fixed charges and expenses are so small per barrel that the company will be able to operate the winter wheat mills of the Eastern Milling & Export Company, in connection with the spring wheat mill at the seaboard profitably, even during periods of the greatest depression.

The new company anticipate a great saving in the cost of manufacture over their Western competitors, who operate their mills in the wheat fields. The ocean piers on which the mill and elevator will be located will have ample facilities to enable the largest ocean steamers to load their cargoes of flour, feed and wheat without charge for lighterage.

The mill will also have the additional advantage of being located on the Belt Line Railroad, which enables it to receive and discharge freight on all roads entering Philadelphia—viz., P. R. R., P. & R., B. & O., and L. V. and all their connections, an advantage enjoyed by no other mill in this country.

The officers of the company are Samuel T. Kerr, president; Andrew J. Toomey, vice-president; D. R. Locher, treasurer, and Charles K. Hannan, general manager.

Pressed Steel Car Company.

At the annual meeting of the Pressed Steel Car Company, held at Jersey City on Wednesday the 22d inst., the following directors were elected: A. H. Larkin, F. N. Hoffstot, J. W. Friend, J. H. Reed, T. H. Given, H. E. Moller, Henry Phipps, G. E. Macklin and F. G. Ely. F. N. Hoffstot was re-elected president of the company and J. W. Friend, vice-president. The second vice-president, treasurer and secretary have not yet been appointed. P. S. Jenks was appointed assistant treasurer.

W. N. Durant of Milwaukee, Wis., has prepared a handsome catalogue of his large variety of standard counting machines, which are accurate, durable and reliable at all speeds.

New Publication.

LIGHT, HEAT AND POWER IN BUILDINGS. By Alton D. Adams, member American Institute of Electrical Engineers. One 12mo vol.; cloth; 102 pages. Price, \$1. New York: W. T. Comstock.

This book is intended as a convenient manual on the subjects treated, its object being to present in compact form the main facts on which selections of the sources for light, heat and power in buildings should be based. In the discussion of the subject questions of economy and efficiency are very fully discussed, and the requirements of equipment to suit different conditions. While scientific theories are referred to, the purpose is rather to make practical suggestions that will be applicable in actual practice than enter upon theoretical discussions as to the merits of various classes of apparatus. The feature of special interest in the work and its main novelty, that of arrangement by cost of service from widely different sources, are set down side by side. This feature of this work is one that will be appreciated by all who wish to study up the essential features of plants of this character. It will be found a useful and ready reference for such purposes.

Our Enormous Pig Iron Production.

James M. Swank's report of the output of pig iron in this country in the bulletin of the American Iron and Steel Association gives complete statistics of the production of all kinds of pig iron in the United States in 1901; also complete statistics of the stocks of pig iron which were on hand and for sale on December 31, 1901.

Production.—The total production of pig iron in 1901 was 15,878,354 gross tons, against 13,789,242 tons in 1900, 13,620,703 tons in 1899, 11,773,934 tons in 1898 and 9,652,680 tons in 1897. The following table gives the half-yearly production of pig iron in the last three years, in gross tons:

Periods.	1899.	1900.	1901.
First Half.....	6,289,167	7,642,569	7,674,613
Second half.....	7,331,536	6,146,673	8,203,741

Totals..... 13,620,703 13,789,242 15,878,354

The increase in production in the first half of 1901 over the second half of 1900 was 1,527,940 tons, and the increase in production in the second half of 1900 over the first half of 1901 was 529,128 tons. The total increase in 1901 over 1900 was 2,089,112 tons. This is a larger increase than the boom year 1899 showed over the year 1898.

The production of Bessemer pig iron in 1901 was 9,596,793 tons, against 7,943,452 tons in 1900.

The production of basic pig iron in 1901 was 1,448,850 tons, against 1,072,376 tons in 1900.

The production of spiegeleisen and ferromanganese in 1901 was 291,461 tons, against 255,977 tons in 1900.

The production of charcoal pig iron in 1901 was 360,147 tons, against 339,874 tons in 1900. The production of mixed charcoal and coke pig iron in 1901 was 23,294 tons, against 44,608 tons in 1900.

Unsold Stocks.—Our statistics of stocks of unsold pig iron do not include pig iron made by the owners of rolling mills or steel works for their own use, but only pig iron made for sale and which has not been sold. The stocks of pig iron which were unsold in the hands of manufacturers or which were under their control at the close of 1901, and were not intended for their own consumption, amounted to only 70,647 tons, against 442,370 tons at the close of 1900 and 372,560 tons on June 30, 1901.

The American Pig Iron Storage Warrant Company held in their yards, on December 31, 1901, 3000 gross tons of pig iron, of which 2400 tons were coke and 600 tons were charcoal. None of this iron was controlled by the makers. Adding this 3000 tons to the 70,647 tons of unsold stocks, above mentioned, we have 73,647 tons of pig iron which were on the market at the close of 1901.

The total production of iron by States in 1901 was as follows: Pennsylvania, it will be seen, made nearly half the iron produced in the country, and the output of the State was only a few hundred thousands of tons less than that of Great Britain and nearly equal to Germany's production:

States.	Production. Gross tons of 2240 lbs. (Includes spiegeleisen.)		
	First half of 1901.	Second half of 1901.	Total for 1901.
Massachusetts	1,952	1,434	3,386
Connecticut	4,621	3,821	8,442
New York.....	109,317	174,345	283,662
New Jersey.....	65,524	90,222	155,746
Pennsylvania	3,549,148	3,794,109	7,343,257
Maryland	157,628	145,558	303,186
Virginia	217,819	230,943	448,662
North Carolina.....	15,547	11,786	27,333
Georgia	627,214	597,998	1,225,212
Alabama	1,320	953	2,273
Texas	74,630	91,967	166,597
West Virginia	26,361	42,101	68,462
Kentucky	178,244	158,895	337,139
Tennessee	1,598,850	1,727,575	3,326,425
Ohio	739,409	857,441	1,596,850
Illinois	93,981	76,781	170,762
Michigan	124,273	83,278	207,551
Wisconsin			
Minnesota			
Missouri			
Colorado			
Oregon.....	88,775	114,634	203,409
Washington			
Totals	7,674,613	8,203,741	15,878,354

Stocks of pig iron fell to the lowest figure ever reported and at the end of the year iron on hand amounted to only 70,647 tons, as compared with 442,370 tons on December 31, 1900. The stocks of iron, according to the fuel used, were as follows on the dates named:

	June 30, 1900.	December 31, 1900.	June 30, 1901.	December 31, 1901.
Bituminous	209,978	261,407	197,396	42,426
Anthracite	105,233	110,127	113,117	12,007
Charcoal	18,799	62,578	58,083	15,950
Mixed charcoal and coke...	4,043	8,258	3,964	264
Totals.....	338,053	442,370	372,560	70,647

OBITUARY.

EUGENE DUPONT, president of the powder manufacturing firm of E. I. Dupont de Nemours & Co., died on January 28 at his home, in Christiana Hundred, near Wilmington, Del., at the age of 61 years. He was the son of Alexis I. Dupont, and succeeded the late General Henry Dupont as president of the company in 1889.

JULIUS PRAGER, who had conducted a gas engine and safe business in Pittsburgh, Pa., for many years, died on January 19, aged 63 years. Mr. Prager was a native of Germany and came to this country in 1858.

CHARLES T. MEANS, who was president of the Manchester Locomotive Company when they were taken over by the American Locomotive Company, died on January 25 at his home in Manchester, N. H., aged 46 years.

William H. Chapman, formerly president of the Union Bank of New London, Conn., has presented that city with a gift of \$100,000 for the establishment of an institution to be named the Manual Training and Industrial School of New London. Plans are being prepared for the erection of a suitable building for the institution.

Edwin H. Martin has resigned as superintendent of the Diamond State Steel Company, to accept a responsible position with the Carnegie Steel Company.

Pickands, Mather & Co. of Cleveland, Ohio, have issued a pamphlet giving full chemical analysis of lake ores for 1902.

The Cleveland Machinery Market.

CLEVELAND, OHIO, January 27, 1902.—Reports gathered from the local machinery trade indicate that every one is enjoying all the business that can comfortably be attended to, with no indications of a let up. Dealers report that January has been one of the best months on record, but with comparatively few very large contracts. It appears that so many of the leading concerns in this section made extensive additions and improvements to their plants during the past year that for a time there will be comparatively little in the way of extensive improvements other than those which have been previously referred to in these columns. On the other hand one leading machinery concern who last summer practically doubled the capacity of their plant, are again preparing for another big addition, indicating that they are satisfied that the prosperity which has been theirs is to be continued for an indefinite period. Reports are at hand this week of at least three large railway shops, two of them having been officially announced and one already in the market for a large list of tools. Dealers in second hand machinery say it is difficult to secure more than one-third the number of tools inquired for.

George H. Bowler, dealer in second hand machinery, is selling a portion of the equipment of the Boston Roller Bearing Company of Boston, including about 60 pieces of medium sized tools of all kinds. The special machinery and patents of the concern have been bought by the Standard Roller Bearing Company, Philadelphia. Mr. Bowler is also selling a large list of unavailable machinery from the Alliance, Sharon, Pa., and Thurlow, Pa., plants of the American Steel Castings Company. The list includes equipment of all kinds, there being besides machine tools, a 600 horse-power Allis-Reynolds Corliss blowing engine, two 250 horse-power Sterling boilers with automatic stokers, feed water pumps, water heaters, three large jib cranes, and several cupolas. Mr. Bowler says the demand for large second hand tools is heavier than can be taken care of; at present there is an unusual call for large boring mills, planers and lathes.

Wm. A. Reade & Co., who have recently sold the machine shop equipment of the Porter Mfg. Company, Syracuse, are now offering the buildings and remaining equipment. The foundry, 140 x 100 feet, is fully equipped to turn out castings up to 30,000 pounds. The machine shop is 280 x 75 feet, the boiler shop 125 x 70 feet, and the pattern shop 100 x 50 feet, three stories high. The power and heating equipment remains. Reade & Co. are also offering for sale the plant of the Lorain Brass Company, Lorain, Ohio, including six acres of land and main building, 425 feet long; power and heating equipment intact.

The Reade Machinery Company say they are meeting with all the business that can be taken care of in their new line of heavy punches, shears, metal saws, &c. They are getting out a complete catalogue, describing their line of tools designed for bridge, shipbuilding and boiler shop work.

The W. M. Patterson Supply Company are making several large shipments of machinery and equipment to the Philippines. The goods are for the Philippine Transportation & Construction Company, having headquarters at Manila, a concern who were organized a short time ago by Cleveland people to do transporting among the various islands of the Philippines. They have bought up 20 steel canal boats formerly operated by the Cleveland Steel Canal Boat Company, and this week they are making a shipment of nine of these boats. They go by steamer, four being secured to the deck and five cut in two and stored in the hold. The Patterson Company's shipment includes a complete machine shop equipment; also blacksmith shop, pipe shop and carpenter shop equipments, an electric lighting plant, 11 hoisting engines, seven boilers and supplies of all kinds. C. E. Wheeler, formerly of Cleveland, will be resident manager of the company at Manila. The Patterson Company have just sold a 357 horse-power Bates Corliss engine and a 200-kw. Triumph lighting generator to the Bradley Company, Cleveland.

The S. M. York Machinery Company are shipping

four complete machine shop equipments to sugar plants being built by the Kilby Mfg. Company, and a machine shop equipment for a sugar plant being built by E. H. Dyer & Co. in Colorado. They say there has been an improvement in the aggregate amount of business secured during the past month, but orders are for one or two machines rather than for large increased equipments. They have been notified of a 5 per cent. advance in price on one of their lines of lathes; otherwise prices remain the same as last fall. They are experiencing a pronounced run on the radial drills built by Fosdick & Holloway.

The Cleveland Car & Mfg. Company are busier than ever before in their industrial car department. They are furnishing industrial equipments for two large rolling mills, a smelter plant and several large shops.

The Garry Iron & Steel Company have taken a contract for machinery for lowering and raising the gates of a lock being built by the Michigan & Lake Superior Power Company at the Soo.

The entire plants and business of the Chisholm & Moore Mfg. Company have not been transferred to the Chicago Pneumatic Tool Company, as has been commonly reported. E. Y. Moore stated that the transfer includes only the large machine and erecting shops of the pneumatic hoist department, which hereafter will be known as the Moore Pneumatic Crane Plant of the Chicago Pneumatic Tool Company. Mr. Moore is second vice-president of the company, in charge of the plant, and all orders for these goods will probably be handled direct as heretofore. The Chisholm & Moore Mfg. Company will continue in the manufacture of malleable iron castings, chain hoists, door hangers, rail joints and railway specialties as heretofore.

The Acme Machinery Company say that their business was never as heavy as at present. Although they made large additions to their buildings and equipment during the past year, they find it impossible to take care of the orders offered. The outlook for continued good business looks so promising that they have decided to again increase their capacity by erecting another large building. It will adjoin the building erected last year and the front will be designed for offices, the present offices to be torn out and the space used for manufacturing purposes. They are getting out a new catalogue describing their line of bolt and nut machinery.

The Cleveland Punch & Shear Works Company report that the demand for heavy tools continues strong, large orders coming from railway and bridge shops. Among their orders this month have been the following: Ft. Pitt Bridge Works, Canonsburg, Pa., one 54-inch and one 30-inch throat punch and a 36-inch revolving planer; Cincinnati Northern Railway, Van Wert, Ohio, a large double punch and shear; Marine Iron Works, Chicago, one 15-foot arm radial drill and one 42-inch throat punch; Lombard Iron Work & Supply Company, Augusta, Ga., one 36-inch rotary planer; Otis Steel Company, Cleveland, one 20-inch throat punch.

The Pennsylvania Railway Company have made official announcement of the shops to be erected at Columbus, plans for which are nearly completed. There will be a locomotive erecting shop, 660 x 80 feet; a large round house, paint shop, car shop and a large power house. The present erecting shop will be used for machine and fitting shop. The boiler shops are to be remodeled and used as carpenter, locomotive and tank shops. The locomotive shop will be covered by two 75-ton cranes. All machinery will be electrically driven. The cost of improvements is estimated at \$500,000.

The Wheeling & Lake Erie Railway have purchased additional land and will greatly enlarge their shops at Norwalk, Ohio. The present machine shop will be extended 250 feet and a blacksmith shop and a boiler shop will also be erected. The company are securing figures on machinery to cost between \$60,000 and \$70,000. Several Cleveland dealers have received lists of tools desired.

Misapprehension has existed in local circles relative to the future of the McMyler Mfg. Company. It appears that J. C. McMyler has personally bought up the plant of the Excelsior Iron Works, which has been in the hands of a receiver, and has reorganized it as the Ex-

Excelsior Hoisting Machinery Company. The plant will be continued for the manufacture of buckets and other hoisting and conveying machinery of a small character; also for repair work. But the McMyler Mfg. Company will remove in about 60 days to the extensive plant which has been under construction for some months at Warren, Ohio, where they will produce larger lines of hoisting and conveying machinery than heretofore. The equipment of the present McMyler plant will be moved to Warren and more will be purchased. The equipment of the Excelsior plant will also be improved by the purchase of new machinery.

The Peter Gerlach Company, manufacturers of keg and barrel machinery, are fairly swamped with orders for a new bilge sawed nail keg stave machine recently brought out. About a month ago several leading wire nail manufacturers decided to abandon the use of knife cut stave kegs in favor of bilge sawed stave kegs, with the result that all the keg makers in the country are demanding machinery to produce the desired style of keg. The Gerlach Company have on their books orders for nearly 40 sets of machines. They are building seven machines for the Crescent Mfg. Company, Muskegon, Mich.; two for Corrigan & Stafford, Burton, Ohio; two for the Mill Sholes Stave Company, Mill Sholes, Ill.; two for J. B. Reilly, Ensley, Ala.; 12 for Grief Brothers, Cleveland; three for the Bessers Mfg. Company, Alpena, Mich., and two for Edwin Bell Company, Pittsburgh. They will increase their facilities in order to take care of the business.

The Lima Locomotive & Machine Company, Lima, Ohio, have let contracts for the structural work for their new shops to the Champion Iron Company of Kenton, Ohio. The Sprague Electric Company of Paterson, N. J., have secured the contracts for electrical appliances. Specifications for the equipment of the shops are being prepared. It is the intention to commence the construction of the plant as soon as weather permits.

The Stark Rolling Mill Company, Canton, Ohio, have decided to add two more hot mills to the four now in operation. They are at work on a new brick and steel warehouse 200 x 50 feet.

The Canton Roll & Machine Company, Canton, Ohio, have more than doubled their capacity during the past year and are turning out from 75 to 80 tons of castings per week. They are about to commence work on another addition.

In addition to the plant now under construction the Carnahan Stamping & Enameling Company, Canton, will erect a galvanizing department, contracts for which have just been let. The plant will be in full operation about March 1.

Leading foundrymen at Canton are interested in a project to build a blast furnace in that city having a capacity of 250 tons per day. The Wellman-Seaver Engineering Company have engineers on the ground preparing preliminary estimates.

Ground will be broken February 1 on the plant of the Structural Steel Car Company, Canton. The main shop will be 504 x 78 feet, and there will be another structure 175 x 50 for blacksmith and boiler shop. The machinery will all be electrically driven and will be of very heavy type. Much of it has been contracted for. The company have secured a contract for cars sufficient to keep the plant busy for the greater portion of the first year.

The Chillicothe Steel Company, Chillicothe, Ohio, will erect an experimental plant for the production of cast steel, malleable and refined steel under a new process. They expect later to erect a large plant. W. H. Hunter, J. B. Hastings, W. T. McClintick and others of Chillicothe are interested.

The Pennsylvania Railway have bought an extensive building site in Cleveland, and it is stated that plans are being prepared for extensive machine shops.

The River Machine & Boiler Company, Cleveland, have just shipped a number of carloads of machinery to the new Texas plant of the Forward Reduction Company.

The Fairbanks Construction Company, Marion, Ohio, will build an addition to their plant and will engage in the manufacture of traction engines.

The New York Machinery Market.

NEW YORK, January 29, 1902.

A good steady volume of business is reported in all quarters of the trade. Inquiries are coming in steadily, and orders are being closed with less delay than has characterized the market for some weeks past.

Another effort is being made to consolidate the principal builders of traveling cranes and conveying machinery. Parties very influential in the machinery and steel industries are connected with this movement. Options are held on the various plants which are expected to be included in the new company. It is stated that the new concern are to be known as the American Crane & Conveying Company.

The controlling director of one of the largest electric crane companies in this country said: "If our plant is taken over by the new company it will be with the consideration that I maintain control of our company. I don't propose to get out of the crane business and will not sell out our business. The project is still in a state of embryo. The work of organization is in the hands of very good people, and if the consolidation is effected it will be on a very good basis."

Machine Tools.

The Standard Steel Car Company of Pittsburgh, who will erect a plant for the building of steel cars, have placed an order with Manning, Maxwell & Moore for their entire machine tool equipment. The order amounts to \$250,000. The demand is quite brisk, especially in standard lines. A good deal of complaint is to be heard regarding distant deliveries quoted. Shops are becoming more congested with work rather than otherwise. Several large concerns who were expected to place extensive contracts covering lists that they have sent to the trade are now buying piecemeal. Instead of awarding blanket contract for the entire list, they are picking up the tools wherever they can do so to best advantage. For some time considerable interest has been shown by the trade in the important railroads and locomotive builders. Now the shipbuilders are commanding attention. There is a general trend toward increasing the size of shipbuilding plants in general. One of the largest projects of this kind now on foot looks toward a very material increase of the size of the plant of the Townsend-Downey Shipbuilding Company of Shooter's Island, N. Y. Equipment has just been purchased for a new plate shop, which will be 250 x 132 feet. It will contain 31-inch rolls. Other improvements to be definitely decided upon by the new directors, who will soon be elected, are a boiler shop and the doubling of the machine shop. The company are constantly buying machine tools. It is reported in the street that the Standard Oil interests have acquired control of the company, and will be well represented in the coming election of directors. Two large Standard Oil ships are now being built at Shooter's Island, and the New York offices of the company have been moved to the Tidewater Oil Company's building, 1 and 3 Broadway.

A very extensive plant, which will require the purchase of a good deal of machinery, is to be erected at Carteret, N. J., by the Chrome Steel Company of Brooklyn, N. Y. The plant is to be removed from Brooklyn to Carteret. Contracts for the buildings are now being let. Some of the machinery has been purchased, notably a large universal forging machine, which was secured in Germany. Allis engines and Garrison boilers were bought. Henry J. White of 149 Broadway has been appointed consulting engineer on the work. The purchases are being made from the New York offices of the company, at 7 Wall street. Ferdinand E. Canda, the president of the company, is making the purchases, the other officers of the concern are Charles J. Canda, vice-president; F. Mora Canda, secretary, and Thomas I. Jones, treasurer.

The Rapid Transit Subway Construction Company of 13 Park row, New York, are now receiving bids for the cranes to be used in the power station. There will be one 50-ton and one 25-ton electric travelers. J. Van Vleck, the mechanical engineer of the company, is in charge of the work.

We are advised by the Eisenhuth Horseless Vehicle Company of 25 Broad street, New York, that they have acquired the plant of the Keating Wheel & Automobile Company, located at Middletown, Conn. The purchase price was \$210,000. The plant is to be improved and used in the manufacture of motors and vehicles. During the last two years the plant was in the hands of Frederick Betts, receiver.

Active steps are being taken to organize the Southern Supply & Machinery Dealers' Association. A number of prominent machinery and supply dealers in the South are back of the undertaking, and a meeting will be called at an early date to perfect the organization. The services of C. B. Carter of Knoxville, Tenn., who is secretary-treasurer of the Southern Hardware Jobbers' Association, has been secured to take charge of the proposed association.

In connection with the shortage of Canadian rolling stock and the inability on the part of Canadian car shops to cope with the work in hand, press reports state that the Canadian Pacific Railroad Company have completed arrangements for building large locomotive and car works in the east end of Montreal. It is proposed to concentrate their locomotive and numerous car shops at that place, where every car and engine needed by the road will be built. It is said that 350 acres of land have been acquired for the site.

The Petroleum Iron Works of Washington, Pa., inform us that they are soon to enlarge their works. The new building will be 38 x 100 feet, and three large punches, as well as one electric traveling crane and several pneumatic hoists and other machinery will be installed.

The Atlantic Basin Iron Works, whose works are at Brooklyn, N. Y., and offices at 11 Broadway, New York, have taken up a new line of manufacturing. The company are now building traveling cranes. At present their line consists of hand traveling cranes, chain block travelers, chain block jib and tramrail transfer cranes and I-beam trolleys. A. A. De Bonneville, who was well known in the trade as the New York representative of Pawling & Harnischfeger of Milwaukee, is in charge of the new crane department, with offices at 11 Broadway, New York. Several new designs of traveling cranes are now being prepared to be placed on the market.

Arthur P. Schultz, representing the Atalanta Technical Agency, St. Petersburg, Russia, is now visiting American machinery builders. He is at present in the West. Mr. Schultz will make arrangements with American machinery manufacturers for representing them in Russia. He has visited several large machine tool houses. He is making his headquarters while in this country at room 516, Bowling Green Building, 11 Broadway.

Engines, Boilers and Miscellaneous.

Mechanical Engineer J. Van Vleck of the Rapid Transit Subway Construction Company of 13 Park Row, New York, has just sent out specifications for two exciter engines to be used in the power station. Each engine will be of 400 horse-power.

The bid of the Atlantic, Gulf & Pacific Company of San Francisco, Cal., and 13 Park Row, New York, \$553,510 in amount, has been accepted for the construction of a coaling plant at Manila, P. I. This company have at their New York offices specifications for machinery to be used in the erection of dry docks now being built by the company at Mare Island, Cal., and League Island, Pa. Purchases will not be made, however, for several months. The apparatus includes boilers, engines, pumps, &c.

On February 7 a large shipment of mining machinery will be made to Mexico. It will be used in the erection of the initial plant of the Descubridora Mining & Smelting Company, who are to erect a large plant at Descubridora, State of Durango, Mexico. The New York office of the company is located at 76 William street. A. A. Cary of 95 Liberty street, New York, is the consulting engineer and purchasing agent for the company. The present shipment is to be more than duplicated at a later date. The equipment includes two Gill water tube boilers of 160 horse-power each; one 200 horse-power

American Ball engine, direct connected to a C. & C. generator; two 25 horse-power and one 50 horse-power Lidgetterwood hoists, connected to General Electric motors; Connersville blowers; Knowles pumps, and Crocker & Wheeler dynamos. The duplicate plant is to be built condensing and will contain the most improved equipment throughout. The company have a partly developed copper property. A 25-mile steam railway is to be built by the company from the Mexican Central Railroad at Conejas to Descubridora.

The Hudson River Water Power Company of Glens Falls, N. Y., have placed their centrifugal pump order with H. E. Maxfield of 39-41 Cortlandt street, representing the Lawrence Machine Company. The pump is to have an economical capacity of 6,000,000 gallons. It will be direct connected to a Lawrence vertical, 12 x 10, open front engine, and will operate against a 46-foot head.

J. W. Paxton of the Detroit Portland Cement Company of Fenton, Mich., is now in New York purchasing the equipment for a 1000-barrel cement mill. The power plant is to develop 1250 horse-power. Mr. Paxton is stopping at the Imperial Hotel.

Purchases are now being made by the American Smelting & Refining Company of 71 Broadway of equipment for further improving their plants in Kansas, and Aguas Calientes, Mexico. Mr. MacGowan is the purchasing agent for the company.

Eugene H. Sloman of 300 and 301 Union Trust Building, Detroit, Mich., informs us that the Detroit Machine & Valve Company, 118 and 120 Congress street, West Detroit, have purchased all of the machines, patterns, &c., formerly owned by the Murdock Valve Company. They will continue in the manufacture of special tools, machine parts, iron and brass valves, fire boat pipe line supplies and water gates.

Iron and Industrial Stocks.

A somewhat better tone has prevailed in the market for iron and steel stocks, but the volume of sales remains rather light. There has been a revival of rumors that the Steel Corporation are to acquire the Tennessee Company, with little to justify it. More serious is the movement on the part of the National Tube Company to take over the Crane Company, manufacturers of pipe in the Chicago district. The principal advance of the week has been in International Pump common stock.

Dividends.—The Westinghouse Electric & Mfg. Company of Pittsburgh have declared a regular quarterly dividend of 1¼ per cent. on the assenting stock.

The Allis-Chalmers Company have declared the regular quarterly dividend of 1¼ per cent. on the preferred stock, payable February 1.

The Ashton Valve Company have declared the regular quarterly dividend of 1½ per cent., payable February 15.

Catalogues Wanted.—M. H. Treadwell & Co. of 95 Liberty street, New York, who succeeded the Lebanon Mfg. Company, Lebanon, Pa., as manufacturers of railroad cars and special machinery of all kinds, will be pleased to receive catalogues of anything pertaining to their line.

The old Niedringhaus rolling mill of the National Enameling & Stamping Company in St. Louis, Mo., the destruction of which by fire was reported in our last issue, will be replaced by a modern steel structure, work on which will be begun as soon as the debris of the old plant can be cleared away. The mill that was burned was the oldest of all the mills of the former St. Louis Stamping Company, having been built in 1879. The fire was caused by the boiling over of a grease pot, and the building, a wooden structure, 120 x 180 feet, covered with corrugated iron, was totally destroyed, involving a loss to building, machinery and stock of about \$75,000, fully covered by insurance. It was with difficulty that the plant of the Buck's Stove & Range Company, adjoining the mill, was saved from catching fire also.

HARDWARE.

IT is recognized as a general principle in manufacturing business, as, indeed, in commercial life in general, that it is much more advantageous to have a given volume of trade distributed among a number of customers rather than confined to a few. The force of this principle is admitted by Hardware manufacturers. As a rule they desire to have business relations with many houses, whose aggregate trade will absorb their production. Some of them with lines limited in variety or volume have learned by bitter experience the hardship that has resulted from their being too largely in the hands of one or two houses, upon the continuance of whose orders they were in a great measure dependent. Even manufacturers who prefer to market their goods through the jobbing trade recognize the bearing of this principle, and at the same time most of them desire to secure the advantage there is in having relations with the larger retailers whose business is regarded as exceedingly desirable. Those who have succeeded in securing this class of trade as their customers—the character of their goods permitting it and their methods promoting it—are unquestionably in a very strong position.

Manufacturers not infrequently evince a certain feeling of satisfaction when they succeed in selling one or more of the great jobbing houses who occupy a pre-eminent position in the trade. At the same time they recognize the fact that the smaller jobbing houses are among the most desirable classes in the trade for them to cultivate. Having relations with many such jobbing houses of the second, third, or even fourth rank, they find themselves in a very independent position, as it is not essential to the success of their business, or the uninterrupted operation of their factories, that they continue to hold the trade of all these houses. They can safely turn down propositions and refuse terms which under different conditions it might be hard to decline, as they would then be obliged to seek new channels for the distribution of their products. Another important consideration is that the minor jobbing houses are not as insistent in demanding extra discounts or concessions in one form or another as are the great houses, the volume of whose business and their commanding position being regarded as justifying exceptionally favorable terms.

The principle under consideration bears directly on the question of jobbing consolidation about which the trade has of late heard so much. Supposing that there is a great aggregating of jobbing interests, the coming together, for example, of, say, 50 of the prominent wholesale houses of the country, what will be the attitude of manufacturers toward such aggregation? Those who are weak enough to become entirely subordinate to it will make terms with it, and perhaps expect to market all their products through it if this should be desired of them. The great mass of manufacturers, however, will look upon it with disfavor, and will shrink from coming under its power. If it should assume in any way to dictate to the trade, as may be necessary in order to secure for itself the advantages of consolidation, the fear of it and the repugnance with which it would be regarded would promptly and permanently increase. Manufacturers with an ambition to build up an independent business for themselves and their children would fight shy of it. For the marketing of their goods they would prefer

to go to the outside jobbers, and, if necessary, to the retailers. The course of things in the trade would almost certainly give impressive indication of the manufacturers' deep and settled conviction that in a multitude of customers there is safety. In this respect as in others, the project of jobbing consolidation, notwithstanding misleading analogies which some would discover to justify the movement, goes counter to tendencies and laws of trade, which will give good account of themselves if any attempt to combat or ignore them.

Condition of Trade.

The good volume of business referred to in our last issue continues. Both manufacturers and jobbers are fully occupied. Travelers are generally again on the road, and their activities are resulting in good orders, while their reports very generally reflect an excellent condition of things and predict a large business during the season. The trade are not disposed to buy in a speculative spirit, but are placing liberal orders, and are influenced somewhat by the apprehension of scarcity in certain lines. The general tone of the market is decidedly firm and several advances are reported. There are, at the same time, some concessions on certain lines which come about in connection with a revision of costs and as a result of special circumstances, rather than indicating any weakness in the market as a whole. The condition of the Copper market is having some effect on goods into which this metal enters. Foreign business continues to be, on the whole, in a very satisfactory state. The intelligent efforts which are being constantly made by representative manufacturers to make a place for their goods abroad is little by little resulting in a steady increase in the kinds and volume of goods which go abroad. Many of these efforts are made unobtrusively, and the manufacturers cultivating this class of trade often prefer to do it as a still hunt, rather than with a flourish of trumpets. Much is being done throughout the country in increasing the production of Hardware and related goods, as many manufacturers are enlarging their works. Wages are gradually creeping up, not so much in the way of a general advance as in individual cases. A good many manufacturers refer to the difficulty they have in obtaining skilled workmen. The financial condition is excellent. Collections give little cause for complaint.

Chicago.

(By Telegraph.)

Trade conditions are demonstrated to be on a sound basis by the experience of houses whose business is not influenced by any exciting element such as the advance in Wire products. These houses are enjoying a volume of business which shows a fine increase for the month as compared with January of last year. The movement of some classes of merchandise is phenomenal. Tin Plate, for instance, has never before been so active in midwinter. The trade in Roofing Plates is particularly large, and it looks as though dealers regarded Tin Plates as good property in view of the spring prospects. Wire Cloth is becoming scarce with manufacturers of Screen Doors, who are coming into the market to purchase from jobbers, because of the difficulty in securing a satisfactory supply from manufacturers, while the demand for Poultry Netting is so large that a shortage is predicted in this line. Orders for the immediate shipment of Steel Agricultural Goods are among the surprises of this active period. Heavy Hardware is also unusually brisk, the demand running into all departments of this branch of trade. Scarcity of goods is pronounced. Some of the largest houses report that on half the orders they receive some article called for will be

sure to be out of stock. Small goods are advancing in price with the stiffening of Bar Iron. It looks as though quite an advance will be made on a variety of products close to Bars.

St. Louis.

(By Telegraph.)

The demand for goods in the Hardware market is of a general character, and it is difficult to do any specializing. It is said that the especial call is for goods particularly in demand for the spring season. Some announcements of changes in the price-lists are looked for within the next few days in the heavy department of the market, affecting Structural Shapes of all descriptions. Announcement has been received of an advance in the different varieties of Nuts and Bolts. It is still difficult, it is said by the dealers in Heavy Hardware, to keep their stocks complete enough to enable them to supply all the demands of the season.

NOTES ON PRICES.

Wire Nails.—The volume of business in Wire Nails is large, as indicated by the orders being booked for shipment during the months of February and March. The stocks in merchants' hands are generally light, and the demand is such as to keep them moving freely. The general tone of the market is steady. Some annoyance is again occasioned by delayed shipments on account of scarcity of cars. The market for carload lots is represented by the quotation of \$2 to \$2.05, f.o.b. Pittsburgh, plus actual freight to destination.

New York.—The call for small lots of Wire Nails from store shows some improvement. The market is represented by the following quotations: Small lots from store, \$2.25 to \$2.30; carloads on dock, \$2.25.

Chicago, by Telegraph.—Manufacturers of Wire Nails are now so well supplied with orders that they are indifferent about new business, which, however, continues to come in very freely. Jobbers report a sustained heavy trade. They quote single carload orders at \$2.20, and small lots at \$2.25.

St. Louis, by Telegraph.—A liberal volume of business is being transacted in the market for Wire Nails. The price quoted for small lots from store is \$2.25.

Pittsburgh.—Volume of business is heavy, buyers placing liberal orders in the belief that prices may be advanced again at the meeting of Wire Nails mills to be held next week. We quote Wire Nails in carloads and larger lots at \$2 at mill, plus actual freight to destination. Small lots are held at \$2.10 to \$2.15 from store.

Cut Nails.—No change has been made in the price of Cut Nails by the manufacturers, for the month of February. Demand is good and the market firm. Some difficulty is experienced in getting material for the manufacture of Nails. General quotations are as follows, f.o.b. Pittsburgh, plus the actual freight to point of destination, terms 60 days, or 2 per cent. off in 10 days:

Carload lots.....	\$2.05
Less than carload lots.....	2.10

New York.—The demand for Cut Nails at this point is moderate. The price of \$2.25 from store is generally adhered to, but in special instances some jobbers are selling 2 cents below these figures. New York quotations for carload and less than carload lots are as follows:

Carload lots on dock.....	\$2.18
Less than carload lots on dock.....	2.23
From store.....	2.25

Chicago, by Telegraph.—Demand for Cut Nails is only moderate in volume, small lots being maintained at \$2.30.

St. Louis, by Telegraph.—A light business is being done in Cut Nails and quotations are without change. Small lots from store are quoted from \$2.30 to \$2.35.

Pittsburgh.—January prices for Cut Nails remain unchanged for February delivery. Demand is large, and the tone of the market is very strong. We quote Cut Nails at \$2.05 in carload lots and \$2.10 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination.

Barb Wire.—The demand for Barb Wire is larger than

for some time, and the market is steady at the new prices. Indications point to an unusually large spring demand. Quotations for round lots are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days: Painted, \$2.60; Galvanized, \$2.90; less than carload lots, Painted, \$2.65; Galvanized, \$2.95.

Chicago, by Telegraph.—An error was made last week, the single carload price at Chicago being \$2.80 on Painted and \$3.10 on Galvanized, while small lots are 5 cents extra. The movement continues very large, both manufacturers and jobbers reporting a splendid volume of business.

St. Louis, by Telegraph.—Barb Wire is moving liberally, while in the matter of prices there is no change from our last quotation. Jobbers quote carload lots at \$2.95 for Painted and \$3.25 for Galvanized.

Pittsburgh.—Demand is good and the tone of the market is strong. Jobbers are placing liberal orders for spring delivery, and there is some expectation that action may be taken at the meeting next week to advance prices. We quote Galvanized Barb Wire at \$2.90 in carloads to jobbers and Painted at \$2.60, terms 60 days net, 2 per cent. discount for cash in 10 days, f.o.b. Pittsburgh. These prices are probably minimum of the market, and for small lots \$2 to \$3 additional is charged.

Plain Wire.—The outlook for spring trade in Plain Wire is excellent, with a heavy demand. The recently established prices are, we understand, being firmly maintained. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. off for cash in 10 days:

Base sizes.	Plain.	Galv.
To jobbers in carload lots.....	\$1.95	\$2.35
To jobbers in less than carload lots.....	2.00	2.40
To retailers in carload lots.....	2.05	2.45
To retailers in less than carload lots.....	2.15	2.55

The above prices are for the base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

6 to 9.....	Base.....	\$0.40 extra.
10.....	\$0.05 advance over base.....	.40 "
11.....	.10 " " " ".....	.40 "
12 and 12½.....	.15 " " " ".....	.40 "
13.....	.25 " " " ".....	.40 "
14.....	.35 " " " ".....	.40 "
15.....	.45 " " " ".....	.75 "
16.....	.55 " " " ".....	.75 "
17.....	.70 " " " ".....	1.00 "
18.....	.85 " " " ".....	1.00 "

For even weight bundles, 50 pounds and over, 5 cents per bundle advance on above.

Chicago, by Telegraph.—Plain Wire fully maintains its activity in complete correspondence with the excellent business in Wire Nails and Barb Wire. Jobbers quote small lots at \$2.20, base.

St. Louis, by Telegraph.—The volume of business in Plain Wire is said to be on a satisfactory basis. Jobbers quote No. 9 at \$2.25, and Galvanized, \$2.65, with the usual advance for other sizes.

Pittsburgh.—Demand is large and prices firm. We quote Plain Wire at \$1.90 and Galvanized at \$2.35, to jobbers in carload lots, f.o.b. Pittsburgh, usual terms. To the small trade from \$2 to \$3 a ton higher prices are charged.

Carriage Bolts, Machine Bolts, &c.—At their meeting last week the associated manufacturers of Carriage Bolts, &c., made an advance on nearly all lines of about 7½ per cent. A revised list on Common Carriage Bolts was also adopted. The revised discounts are as follows, subject to the usual additional discount to the large trade:

	Discount.
Common Carriage Bolts.....	.60 and 10 %
Machine Bolts, with H. P. or C. P. Plain Nuts.....	.65 and 7½ %
Machine Bolts, with C. & T. Nuts.....	.60 and 10 %
Machine Bolts, without Nuts.....	.65 and 7½ %
Machine Bolts, Blanks.....	.65 and 7½ %
Bolt Ends, with H. P. or C. P. Plain Nuts.....	.65 and 10 %
Bolt Ends, with C. & T. Nuts.....	.65 %
G. P. Coach Screws.....	.75 %
Cone Point Lag Screws.....	.75 and 5 %
Skein Screws.....	.75 %
Forged Set Screws and Tap Bolts.....	.60 %
Plow Bolts and Guard Bolts.....	.60 %
Washer Head Coach Screws.....	.70 and 5 %

Nuts.—In addition to the advance in Cold Punched Nuts which we noted in our last issue, the manufacturers, at a subsequent meeting, advanced Hot Pressed Nuts also 1-10 cent per pound. Their published quotations on both of these lines are accordingly as follows, subject to the usual abatement on large lots:

	Off list.
Hot Pressed Square Blank Nuts.....	5.10c.
Hot Pressed Hexagon Blank Nuts.....	5.70c.
Hot Pressed Square Tapped Nuts.....	4.90c.
Hot Pressed Hexagon Tapped Nuts.....	5.50c.
Cold Punched Plain Blank Square Nuts.....	4.90c.
Cold Punched Plain Blank Hexagon Nuts.....	5.20c.
C. T. & R. Blank Square Nuts.....	5.10c.
C. T. & R. Blank Hexagon Nuts.....	5.70c.
Cold Punched Plain Tapped Square Nuts.....	4.70c.
Cold Punched Plain Tapped Hexagon Nuts.....	5.00c.
C. T. & R. Tapped Square Nuts.....	4.90c.
C. T. & R. Tapped Hexagon Nuts.....	5.50c.

Sheet Copper.—The manufacturers of this product have issued a new price-list, dated January 23, on a basis of 16 cents, which puts this important line of goods more in harmony with the reductions in Ingot Copper, the latest price being a reduction of 5 cents per pound from the former base of 21 cents, in effect the latter part of 1901.

Ammunition.—The Union Metallic Cartridge Company, Bridgeport, Conn., and 313-315 Broadway, New York, under date January 1, issue a sheet of revised prices announcing changes in Empty Paper Shot Shells, as referred to in detail below. The lists on Challenge, Monarch and Nitro Club Empty Paper Shells have been advanced uniformly \$2 a thousand, the new list being as follows:

Empty Paper Shells.

CHALLENGE.

10 Gauge, 2½ inch to 2¾ inch.....	\$11.00
12 Gauge, 2¾ inch.....	10.00
12 Gauge, 2¾ inch to 3 inch.....	11.00
14 Gauge, 2 9-16 inch.....	9.50
16 Gauge, 2 9-16 inch.....	9.50
20 Gauge, 2½ inch.....	9.50
20 Gauge, 2¾ inch.....	10.50

MONARCH.

10 Gauge, 2½ inch to 2¾ inch.....	\$11.00
12 Gauge, 2¾ inch.....	10.00
12 Gauge, 2¾ inch and 2¾ inch.....	11.00
16 Gauge, 2 9-16 inch.....	9.50
20 Gauge, 2½ inch.....	9.50

NITRO CLUB.

24 Gauge, 2½ inch.....	\$9.50
28 Gauge, 2½ inch.....	9.50
28 Gauge, 2¾ inch.....	10.50

Representative discounts to the general trade on the various brands of Paper Shells are about as follows:

Challenge, Monarch and Nitro Club.....	20 %
Magic and Acme.....	25 and 5 %
Expert, 10, 12, 16 and 20 Gauge.....	33 1-3 and 5 %
Expert, 8 Gauge.....	20 and 5 %
First quality, 4 Gauge.....	20 and 5 %

The only changes in price of Loaded Shells are as follows: An advance of 5 per cent. in Nitro Club (pink) for bulk smokeless powder, and of Nitro Club (yellow) for dense smokeless powder, these brands being quoted at 40 and 10 per cent. discount. The Arrow brand Loaded Shells (salmon color) take the place of Smokeless and are the same quality as Smokeless, which have been discontinued. The various kinds of Cartridges, Wads, Caps, &c., are unchanged in price, except Primers, which were advanced 20 cents per 1000 on the list January 25. The following net prices now reflect market quotations, viz:

U. M. C. Primers, for all kinds black Powder, in quarter boxes, per 1000.....	\$1.22
U. M. C. Primers, Nos. 1 and 2, in tenth boxes, per 1000.....	1.27
U. M. C. Primers, for Smokeless Powder, in tenth boxes, per 1000.....	1.22

The other Ammunition manufacturers have made corresponding changes in price on competitive goods.

Tarred Roofing Materials and Building Paper.—The recent combination announced in our last issue has not developed any material effect so far, except an increased firmness in prices and a desire on the part of a consider-

able portion of the trade to protect themselves against an advance in the immediate future. In the East the market still continues steady, with a good midwinter demand. The desire on the part of those in control to compromise contracts with some of the salesmen rendered supernumerary by the recent absorption of the Union Coal Tar & Chemical Company, Chicago, by the Barrett Mfg. Company and others, apparently indicates that the latter interests believe they now control the situation. The market on Tarred Roofing Felts is represented by the following prices: F.o.b. mill in carloads per ton, \$28.50 for Single Ply; Two-Ply per roll, 40 cents; Three-Ply per roll, 60 cents. Corresponding prices, in smaller lots, delivered, are \$30 per ton for One-ply, 50 cents per roll for Two-Ply and 70 cents per roll for Three-Ply, although these latter quotations are affected somewhat by the territory to which they go. Rosin Sized Sheathing, f.o.b. mill in carlots, is \$26 per ton; delivered, \$27 per ton, and less than carloads, delivered, \$28 to \$30 per ton. Small lots of, say, a ton or so, are quoted: Light Weight, 35 cents per roll; Medium Weight, 47 cents, and Heavy, 58 cents per roll, delivered.

Steel Squares.—The market for Steel Squares has of late been characterized by some irregularity, but the manufacturers have been getting together again and matters are now in much better shape. The regular price to the retail trade is discount 75 per cent.

Washers.—Last week an advance was made by the manufacturers in the price of Washers, and the market is now represented by the quotation of 6 cents off list. The demand for this line of goods is large, and some of the factories are behind their orders.

Coil Chain.—At a meeting of the manufacturers of Coil Chain an advance of about 5 per cent. was made. Practically all the manufacturers were represented in this connection. This line of goods is firmly held, with a large volume of business.

Axes.—It is understood that negotiations with a view to effecting a strong organization representing Axe interests are being continued with a possibility of a successful consummation. With the uncertainties attending a movement of this kind it is obviously impossible to forecast the outcome, but the indications are interpreted by well informed parties as promising an improvement on the conditions which have for some time prevailed. It is understood that manufacturers will confer in the near future in regard to prices.

Horseshoes.—The Horseshoe market continues in excellent condition, being further improved by the advance of 10 cents recently made on Burden's Shoes.

Double Pointed Tacks.—This is a line which does not appear to be characterized by as satisfactory conditions as others. Notwithstanding the large volume of business and the cost of the raw material, prices are low and uneven, a discount of 90 and eight 10s being obtainable on good orders.

Phosphor-Bronze Smelting Company.—The Phosphor-Bronze Smelting Company, Philadelphia, Pa., issue under date January 1 price-list No. 20, applying to their Delta Metal. It gives the prices of Delta Metal Rods and Wrought Bolts and Nuts, together with a table of approximate weights of Delta Metal Bars and Plates.

Conductor Pipe, Eave Troughs, &c.—The market for this line is regarded by the manufacturers as in excellent condition, and some of them are showing a good deal of conservatism in accepting orders. It is intimated as not unlikely, in view of the condition of the market in the raw material and the large demands the trade are making upon the makers, that prices will be advanced before very long.

Glass.—On January 24 the Jobbers' Association placed an order for 500,000 boxes of Glass with the American Window Glass Company and the Co-operative Federation, at 89 and 2½ per cent. discount for single, and 89 and 5 per cent. discount for double strength off the manufacturers' list. This list, it is understood, is about 30 per cent. lower than the jobbers' list now in use. This price is referred to as being a drop of fully 10 per cent. in view of the advance in wages, to which further reference will be made. The Jobbers' Associa-

tion agreed upon the following minimum discounts from the jobbers' list of January 21, 1901:

	Discount.
From store	90 and 10 %
F.o.b. factory, carload lots:	
Single strength.....	90 and 10 and 7½ %
Double strength.....	90 and 10 and 10 %

As the American Glass Company and the Federation Co-operative firms affiliated with them would lose money and demoralize the market if prices were cut, they made an adroit move, which was announced at the close of the meeting on January 24. Instead of cutting prices, wages were advanced 10 to 15 per cent., according to the different classes of workmen, thus giving the money they would lose at cut prices to the workmen. This move on the part of the American Company was not so disinterested at might at first appear, and accounts for recent reports of "a rod being in pickle" for the Independent Company. The move was expected to draw workmen from the outside factories to fill vacancies in the combine's plants, and to make business unprofitable for outside factories. The American Company are credited with having about 1,000,000 boxes of Glass in stock, made at previous wages, while it is stated that outside factories, who have been selling Glass freely since January 1, for future delivery, at low prices, have little or no stock on hand. When the news of the advanced wages was received the Independent Company immediately informed their workmen that they might expect a corresponding advance. This is the present situation of the Glass market, and future developments will be watched with much interest by the trade.

Paris Green.—The demand for Paris Green has begun exceptionally early this season, and for the past two weeks has been quite large. For the last two years buyers have been reluctant to come into the market early, so that their readiness to buy at this time is the more marked. The quantity of Green already ordered is accounted for by the small amount carried over from last season; also by the large planting of potatoes which is anticipated as a result of the high price of last year's crop. There is no price agreement among manufacturers, which results in a variety of quotations, ranging from a base price of 10¼ to 12 cents per pound. Some makers charge ½ cent advance over ton prices for smaller lots. The view is expressed that prices will go higher.

On a basis of 11 cents per pound, extras are as follows:

Arsenic, kegs or casks.....	11 c.
Kegs, 100 to 175 pounds.....	11½c.
Kits, 14, 28 and 56 pounds.....	12½c.
Paper boxes, 2 to 5 pounds.....	12¼c.
Paper boxes, 1 pound.....	12½c.
Paper boxes, ½ pound.....	13½c.
Paper boxes, ¼ pound.....	14½c.

Cordage.—There are no particularly interesting features in the Rope market. Quotations are unchanged, with a moderate demand. Quotations differ with various manufacturers, as follows, on a basis of 7-16 inch and larger: Sisal Rope, 9 to 9¼ cents; Manila Rope, 12½ to 13 cents, with ¼ cent per pound rebate allowed on large quantities.

Paints and Colors.—**Leads.**—There is a fair business reported for prompt delivery for White Lead in Oil, while a larger number of orders are being booked for February and March delivery. Reports of concessions of ¼ cent per pound or more, according to brands, continue. General quotations are as follows: In lots of 500 pounds and over, 6 cents per pound; in lots of less than 500 pounds, 6½ cents per pound.

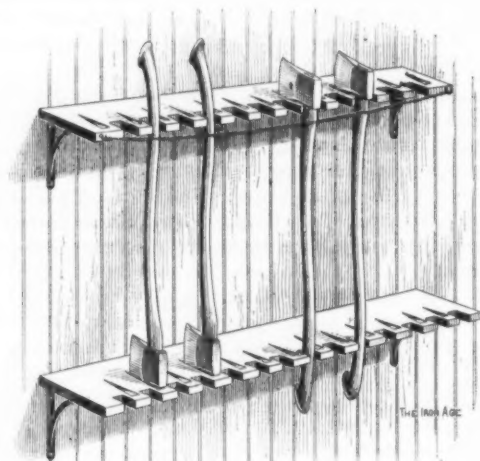
Oils.—**Linseed Oil.**—On the part of Western crushers there is said to be more of an inclination to meet 60 cents on futures, which price, it is understood, has been made by some Eastern concerns. City Raw is quoted from 60 to 62 cents per gallon, and out of town brands at 60 to 61 cents, according to quantity. Buyers show a lack of interest in the market, while crushers are reported as not forcing sales. There is the usual seasonable distribution of Oil in small lots.

Spirits Turpentine.—Owing to reports from Southern markets, Turpentine has advanced 1 cent per gallon

during the week. These reports indicate that thus far the receipts are some 26,500 barrels short, and are still running behind last season. The market at this point is quiet, with little Turpentine changing hands, while holders are firm, refusing to sell at lower prices. Quotations, according to quantity, are as follows: Southern, 44½ to 45 cents; machine made barrels, 45 to 45½ cents per gallon.

AN AXE RACK.

A CONVENIENT method of displaying Axes in stock is in use in the store of E. H. Lawrence, Stamford, Conn., and is shown in the accompanying illustration. The shelves are made of 1-inch board, and are held in position by Shelf Brackets placed 24 inches apart, the upper shelf being 5½ inches wide and the lower 7 inches in width. In each shelf is a series of notches, in which the Axe Handles rest, and places are cut in the shelves for the Axes. These are shown plainly in the illustration.



An Axe Rack.

When the rack is full of Axes they are so placed that the head of one rests on the upper shelf, and its handle below in the notch of the lower shelf. The head of the next Axe stands on the lower shelf, its handle being in the notch in the upper shelf. The head of the next Axe rests on the top shelf, &c. A brass chain fastened on screw hooks runs along the front of the upper shelf to prevent the Axes from falling in case a customer happens to touch them in passing.

NEW YORK STATE RETAIL HARDWARE ASSOCIATION.

THE communication which appeared in our last issue has called out the following letter from a representative Hardware merchant in New York State. It will be observed that he refers to the desirability of forming an association, and his readiness to co-operate in the movement:

"The article in *The Iron Age*, 23d inst., on Retail Hardware Association in New York State, attracts my attention, relating, as it does, to a matter that has long suggested itself to me. I did not, however, feel qualified to urge the organization myself, but should be glad to assist.

It seems that New York State should be foremost in such a matter as in almost everything else, and why our retail Hardware dealers have not long ago had such an organization is strange.

If you can suggest some plan to start the ball rolling I shall be glad to assist and do my little toward the success of the movement.

We shall be very glad to hear from other merchants who would be willing to take part in the initial steps toward the formation of an association.

Hardware Organizations.

Ohio Hardware Association.

We are just in receipt of the programme for the eighth annual convention of the Ohio Hardware Association, on Tuesday, Wednesday and Thursday, February 25, 26 and 27, at Columbus. The headquarters of the association will be at the Great Southern Hotel, where the meeting will also be held, there being a large convention hall connected with the hotel. An interesting programme has been prepared and the opinion is expressed that the Ohio Hardwaremen who do not attend will miss a treat.

The convention will be called to order on Tuesday afternoon at 2 o'clock, with prayer by the Rev. Dr. Washington Gladden. An address of welcome will follow from J. Y. Bassell, secretary of the Columbus Board of Trade, the response being made by President Scott for the association. The remainder of the afternoon will be devoted to hearing reports, appointment of committees and routine work. The morning session on Wednesday will be opened by A. Rothwell with an address on the subject of "Stoves." This will be followed by report of Committee on National Association, J. P. Duffy, chairman. Hon. F. B. Willis will then address the gathering on the "Iron Industry." W. P. Bogardus, chairman, will report for Committee on Lien Laws. At the afternoon session J. H. Smith of Smith Bros. Hardware Company, will address the convention on "The Traveling Man," and C. W. Jewell will discuss "Honorable Success." The contents of the Question Box will be analyzed at this session. F. A. Powers will read a paper on Thursday forenoon on the topic, "Some Hardware Don'ts." In the afternoon the convention will come to a close with reports of committees on resolutions and nominations, election of officers, &c.

On Tuesday evening the members will be the guests of the Columbus dealers, who have arranged a musical entertainment for their benefit. Wednesday evening the annual banquet will occur at the Great Southern Hotel. The speakers at the dinner will be Governor Nash, Hon. F. B. Willis, Colonel Kilbourne, and Henry C. Wiseman.

Geo. M. Gray, Coshocton, corresponding secretary, requests us to announce that the association has secured a railroad fare at one and a third rate on the certificate plan from all points in Ohio.

Missouri Retail Stove and Hardware Dealers' Association.

In our last issue we referred to the programme for the meeting of the Missouri Retail Stove & Hardware Dealers' Association at St. Louis, February 18 and 19, at the Mercantile Club. We are requested to state that a fare of one and a fifth has been secured from the Pennsylvania Railroad, date of sale February 15 to 21, good to return up to March 1. Parties attending meeting should buy ticket to St. Louis and secure certificate from agent, which when signed at St. Louis by the secretary of the association will insure a return ticket at one-fifth fare.

In a circular relating to the convention the following appeal to Missouri Hardwaremen who are not members of the association is made by the secretary, Frederick Neudorff, St. Joseph:

Mr. Hardwareman:

Concentration, consolidation and combination are the factors in the business world to-day. The union of capital on the one side, the union of all labor on the other, is a fact and has been for some time. The only unorganized body are the middlemen or merchants. What the outcome of this tendency will be no one can foretell. But don't you think it a part of wisdom to be prepared for whatever the future has in store? Singly we can do nothing, united our influence will be respected. Much has already been accomplished by the association for our benefit. It is not just that the few should carry all the burden, and we ask you to become one of us by sending your name and \$3 to the secretary and meet with us at our annual meeting.

The Chicago Hardwaremen's Annual Ball.

The Chicago Retail Hardware Association held their ninth annual reception and ball in the North Side Turner Hall, Chicago, on the 22d inst., under the management of the following committees:

Executive Committee: A. J. Englehardt, chairman; Fred. Ruhling, secretary; J. L. Smith, treasurer; W. B. Costello, H. E. Rebman.

Reception Committee: D. McLaughlin, chairman; James Gormley, C. F. Wooley, Martin Engelhart, A. L. Peterson, Frank F. Porter, E. R. Schlick, J. H. Bixler, C. Carr, Jr.; George J. Pfeller, W. M. Powers, Otto Hagen, John Schubert, William Winkenwerder.

Floor Committee: W. T. Gormley, chairman; George A. Neeb, George A. Englehardt, E. Sander, A. L. Adam, W. J. Krueger, O. Stebbins.

Refreshment Committee: G. R. Lott, chairman; H. E. Gnadt, J. F. Borchardt, S. Melohn, F. H. Schanze, H. C. Peppler, J. Hora.

The ball was very successful in every respect. The members and their friends turned out in great force and passed a most enjoyable evening. The various committees discharged their duties admirably, all the arrangements contributing to the complete entertainment of those in attendance. The Chicago dealers have always assiduously cultivated the social side of their organization while vigorously pushing the features which have made their association a source of practical benefit to the members. Interest is thus doubly maintained and continuous growth is the result.

Pacific Retail Hardware Association.

The annual meeting of the Pacific Retail Hardware Association was held on the 15th and 16th inst., at Nevada City, Cal. The gathering proved to be a pleasant and profitable one. A good representation of the membership was in attendance. Among the papers read at the meeting were: "Reciprocity in Trade," by Oscar C. Schulze of Dixon; "The Social Side of Business Life," by A. F. Brady of Grass Valley; "Credits and Collections," by Thomas B. Gibson of Woodland.

A number of jobbers and their representatives were present by invitation at the afternoon session on the 16th inst. Most of the former officers were re-elected for the coming year, as follows:

JOHN C. WHITE, Marysville, president.
OSCAR C. SCHULZE, Dixon, vice-president.
WILLIAM EARLL, Chico, treasurer.
R. W. BOYD, Marysville, secretary.
J. B. GIBSON, Woodland, member Executive Committee.
A. F. BRADY, Grass Valley, member Executive Committee.

It was decided to hold the next annual meeting at San Francisco. On Thursday evening a fine banquet at the National Hotel was tendered the association by the Hardware merchants and business men generally of the city. Over 100 covers were laid and the occasion proved most enjoyable. Judge F. T. Nilon presided as toastmaster. The following toasts were responded to: "The Association," Oscar C. Schulze; "Co-operation," Hon. E. M. Preston; "The Steel Industry of the Pacific," A. L. Scott of San Francisco; "The Future of San Francisco," Andrew Carrigan; "Uncle Sam Abroad," A. C. Rulofson.

St. John Iron and Hardware Association.

The annual dinner of the St. John Iron and Hardware Association took place at the Union Club, St. John, N. B., on the 22d inst., and was a brilliant affair. The tables were handsomely decorated and an orchestra was present and furnished excellent music during the evening. The menu was handsomely gotten up in old English style in red, black and gold. It was in the shape of a folder and tied together with ribbon to match. President S. Hayward occupied the chair and proposed the first toast of the evening, "The King," which was responded to by the singing of the national anthem. The president then proposed the toast of "Our Association," which was responded to by W. S. Fisher and W. H. Thorne. Songs were given by Wm. Greig and John Keefe. P. McMichael, vice-president, proposed the toast to "Our Sister Associations," which brought speeches

from Mr. Foster, Mr. Bacon and Mr. Morris. W. S. Fisher proposed the toast to "The City of St. John," and this was responded to by Mayor Daniel, Alderman Robinson and W. M. Jarvis, president of the Board of Trade. J. P. McIntyre favored those present with a song. He was followed by M. E. Agar, who proposed the health of "The Iron and Hardware Manufacturers." This toast was replied to by P. McMichael, R. B. Emerson, W. O. Purdy, J. S. Neill and John McAvity. The toast to "Our Guests" was proposed by Vice-President P. McMichael and responded to by Geo. Robertson. Geo. McDonald proposed the health of "The Ladies," and Jas. Harrison, Mr. Foster, Mr. Foote and W. H. Thorne responded. The dinner was brought to a close with the singing of "Auld Lang Syne."

Iowa Retail Hardware Dealers' Association.

The officers of the Iowa Retail Hardware Dealers' Association have changed the headquarters for their Des Moines meeting, February 18-20, from the Savery to the Kirkwood Hotel. The programme of this meeting was given in our last issue.

A MINIATURE FARM.

A miniature farm, complete with farm house and other buildings and with fields verdant with growing crops, at-

This window proved so popular that a crowd would be found standing in front of it almost all the time. The sales of seeds are said to have largely increased over previous years, due in a large measure to the window advertising given by the display. The notice shown in Fig. 2 from a local weekly paper shows the kind of a press notice that may frequently be gotten without expense. This serves as a good advertisement, and is so written that it is good news for the paper, being interesting to the readers.

HERE AND THERE.

The following from a New York State merchant suggests that the objects of the show window are to admit light and also to show the interior of the store to the passer-by:

From careful observation of windows one is led to believe that the window permitting a clear and unobstructed view of the store from front to extreme back wall is the best kind. The prime object of a window is the admission of light by day and its emission by night, and consequently a view of the interior of the store by night or day. Two rules we offer for consideration. The first is that first command, "Let there be

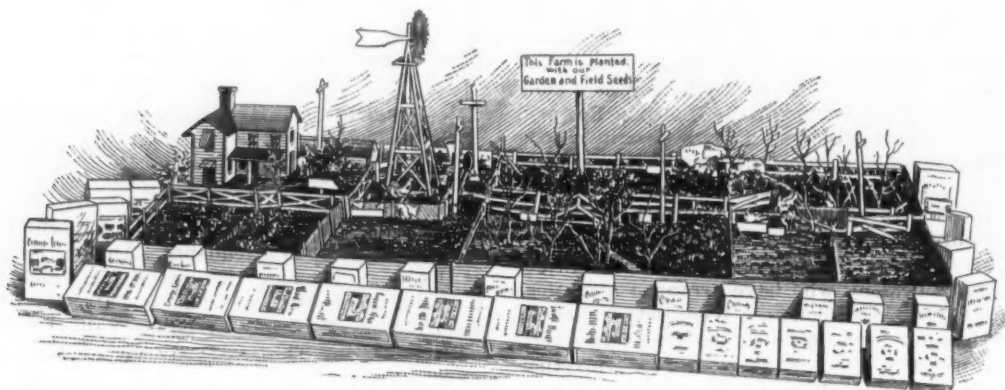


Fig. 1.—Miniature Farm in Show Window.

tracted much attention last spring to the show window of Aug. J. Kronsbein, Malvern, Iowa. This farm, which is shown in Fig. 1, measured 8 feet long by 3 feet wide, and was placed in a wooden box, with the earth so graded as to represent a side hill farm. It was well laid

light," and the second, "Cleanliness is akin to Godliness."

Build no Pandora boxes. They obscure light, and in obscure light dirt will accumulate and destroy goods. In a good, strong light rust and dust are manifest in their incipency. Avoid angles. They have dark corners, into which good goods find their way and are transformed into poor ones.

About two years ago J. H. & S. M. Robinson, Hudson, Mass., placed in a neighboring town some signs, about 4 x 6 feet, with the following inscription:

JOHN AND SID,
THE POPULAR HARDWARE
DEALERS,
HUDSON.

Since then they have been known as John and Sid among the farmers. They claim the ad. is proving to be one of the best they ever had

Some New York druggists, it is reported, get \$10 a day for the use of a show window from the owner of a soap or some other specialty. The thought that arises is, would not the window be worth more than that to the retail merchants if they made therein the proper display of their goods?

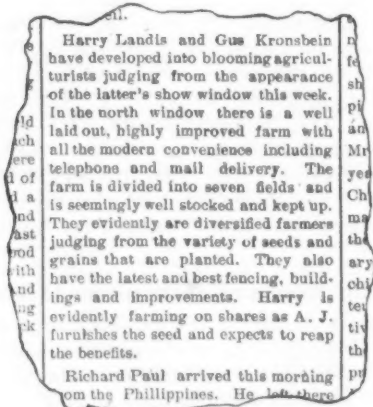


Fig. 2.—Newspaper Notice of Display.

out, and gave the appearance of being a highly improved farm, with all the modern conveniences, including the mail box for rural delivery and telephone. Mr. Kronsbein sells most of the things appearing on the farm, such as the Fencing, Wind Mill, Grindstones, &c. He makes a specialty of Farm and Garden Seeds, and has a variety planted in each of the seven fields in his miniature farm.

NOTES ON FOREIGN TRADE.

BRITISH LETTER.

Offices of *The Iron Age*, HASTINGS HOUSE,
NORFOLK ST., LONDON, W. C., JAN. 18, 1902.

A Warning.

LAST week a large Hardware agent in this country referred to some remarks of mine made at the Cleveland convention last October upon the capriciousness of supply, which has too often marked American exporters. I asked him to state a specific instance, and in reply I have received a letter containing the following:

I was discussing with a very old business friend the desirability of my firm taking up the agencies of one or two good American manufacturers, but he strongly discouraged the idea, as he felt quite sure that the results would be distinctly disappointing to us, as from his experience of American dealers they were far too erratic in their methods of supply, making only supplies when it suited them, and stopping supplies the moment they found a slightly better market. My friend pointed out what I know of my own experience, that this "in and out" policy is most irritating to British buyers. They like above all things a continuity in their business relations. My friend is the senior partner in one of the largest Hardware firms in Great Britain, and a man whose opinion is worth having.

I do not cite this instance merely to prove that what I said at Cleveland was true, but again to warn those interested in developing the American Hardware trade in this country that they must before all things secure a reputation for permanence and regularity of supply.

What America Actually Sends.

It is often a matter of doubt precisely what Hardware goods America sends to us, and in what quantities. It is almost impossible to ascertain the actual value of Hardware imports from America compared with those from Germany. I thought, therefore, it would be a good plan to extract all possible information upon this point, so as to obtain a reliable index to the actual trade done. The British Board of Trade returns do not differentiate between American and German Hardware, and I have therefore endeavored to get from reliable sources the actual Hardware material exported from American ports to English ports for the first fortnight of the year.

The following list gives actually what we bought from America during the period mentioned. I venture the opinion that it is well worth careful study. It will be observed that I have obtained an actual list of goods coming from New York, Boston, Baltimore, Philadelphia and St. John, N. B., to the ports of London, Liverpool, Bristol, Manchester, Southampton and Hull. Probably a number of exporters will recognize their own shipments on the appended list:

January 1, s. s. "Mesaba,"
New York to London.

647 pkgs. Hard, Wood and Metal Ware.
102 pkgs. Machinery.
95 pkgs. Electrical Goods.
74 pkgs. Handles, Spokes, &c.
104 pkgs. Typewriters.
68 cs. Steel.
1030 pcs. Iron Pipe.
188 pcs. T. Poles.
1234 pkgs. Nails.
120 pkgs. Wringers.
4716 pgs. Lead.
500 pkgs. Oil Stoves.
347 pkgs. Radiators.
30 pkgs. B. Lead.
10 pkgs. Lamps.
49 cs. Lanterns.
40 cs. Cash Registers.
12 Iron Safes.
13 pkgs. Mowers.
9 pkgs. Bicycles.
176 pkgs. Castings.

January 3, s. s. "Anglian,"
Boston to London.

185 cs. Ferro Plates.
21 pkgs. Hardware.
5 pkgs. Handles.
4 pkgs. Bristles.
16 pkgs. Machinery.
10 pkgs. Woodware.
245 pkgs. Agricultural Implements.
165 pkgs. Buckets.
84 pkgs. Blowers.
42 cs. Wire Goods.
16 pkgs. Hardware.

January 1, s. s. "Marquette,"
New York to London.

39 pkgs. Sewing Machines.
282 cs. Crude Ore.
90 cs. Copper.
11 pkgs. Machinery.
1804 pkgs. Machinery.
181 pkgs. Radiators.
2 Steam Wagons.
77 pkgs. Hard, Wood and Metal Ware.
37 pkgs. Typewriters.
4148 pgs. Spelter.
107 cs. Copper.
2353 pgs. Lead.
10 brls. Forgings.
12 pkgs. Hubs.
404 cakes Copper.

January 1, s. s. "Knight Commander,"
Baltimore to London.

13,002 ingots Copper.
13 brls. Iron Pipe.
73 pkgs. Tinware.
38 pkgs. Castings.
3 cs. Saws.
198 cs. Spokes.

January 2, s. s. "Philadelphia,"
New York to Southampton.

186 pkgs. Roofing Slates.
596 pkgs. Hardware.
55 pkgs. Machinery.
102 pkgs. Typewriters.
915 bars Silver.

January 2, s. s. "Canadian,"
New York to Liverpool.

485 pkgs. Hardware.
183 brs. Copper Matte.
100 brls. Wire.
745 bgs. Nails.
935 slabs Spelter.
28 pkgs. Motor Parts.

December 31, s. s. "Jersey City,"
New York to Bristol.

10 cs. Implements.
24 cs. Wringers.
12 pkgs. Car Materials.
26 cs. Hubs and Spokes.
8 cs. Hardware.
40 brls. Wire.

January 3, s. s. "Minnesota,"
Philadelphia to London.

16 pkgs. Ironware.
136 pcs. Iron Pipe.
13 pkgs. Casings.
83 pkgs. Wheels, Spokes, &c.
163 brls. Zinc Dross.

January 2, s. s. "Germanic,"
New York to Liverpool.

21 pkgs. Machinery and parts.
30 pkgs. Pulleys and parts.
120 brls. Handles.
424 brls. Handles.
157 pkgs. Hardware.
24 pkgs. Machinery.
355 brls. Maple Flooring.
95 brs. Iron and Tin Plates.
6 crts. Wheels.
81 pcs. 31 brls. Pipe.
26 brs. Bicycle parts.

January 2, s. s. "Corinthian,"
St. John, N. B., to Liverpool.

34 brs. Windmills.
232 pcs. Oak Lumber.

January 4, s. s. "Campania,"
New York to Liverpool.

3 pkgs. Machinery.
300 bars Silver.
27 pkgs. Hardware.
47 pkgs. Cash Tillas.
11 pkgs. Lamp Burners.
2 cs. Machinery.
69 cs. Steam Governors.
13 cs. Typewriters.
150 brls. Handles.
1231 pgs. Copper.
1490 pkgs. Electric Line Fittings, &c.
25 brls. Casings, &c.
1103 brls. and 643 Staves.

January 3, s. s. "Caledron,"
New York to Manchester.

270 bgs. Wire Nails.
1570 brls. Hard Wood Strips.
168,250 lbs. Washed Metal.
70 cs. Wagon Material.
9133 pgs. Lead.
281 pkgs. Machinery.
94 att. Rail.
83 brls. Splice Bars.
3 brls. Tee Rods.
12 brs. Steel Shafts.
50 cs. Steel Bars.
28 crts. Wheels.
17 cs. Car Material.
82 cs. Lanterns.

January 1, s. s. "Ultonia,"
Boston to Liverpool.

5482 pcs. Hard Wood Lumber.
525 pcs. Walnut Lumber.
26 pkgs. Radiators.
21 pkgs. Machinery.

January 7, s. s. "Europe,"
Baltimore to London.

90 cs. 34,853 ingots Copper.
94 pkgs. Tinware.
14 cs. Gas Stoves.
12 pkgs. Bathtubs.
219 pkgs. Glassware.

January 7, s. s. "Montauk Point,"
Philadelphia to London.

100 brs. Electrical Machinery.
300 bgs. Nails.
495 pkgs. Wire.
77 brs. Metal Goods, &c.
296 pkgs. Agricultural Implements.
127 pkgs. Glassware.
60 pkgs. Wood Work.

January 6, s. s. "Bovic,"
New York to Liverpool.

5400 pcs. Staves.
4855 pgs. Lead.
650 brls. Copper Matte.
2800 pcs. Lead.
6665 pgs. Lead.
153 brls. Copper.
164 pcs. Iron Pipe.
17 pcs. and pkgs. Machinery.
142 Steel Motor Castings.
1026 pgs. Copper.
10 crts. Car Material.

January 6, s. s. "Ivernia,"
Boston to Liverpool.

26 rolls Wire.
71 cs. Machinery.
January 6, s. s. "Vedamore,"
Baltimore to Liverpool.
1206 bgs. Wood Work.
360 kgs. Wire Nails.
493 brls. Handles.
36 crts. Wheels.

5486 plts., 3567 bars, 8968 ingots Copper.
50 dble.-bgr. Crushed Steel.
30 brs. Steel Tubing.

January 6, s. s. "Lancastrian,"
Boston to Liverpool.

165 pkgs. Machinery.
761 brls. Wire.
33 pkgs. Wheels.
2640 brls. Maple Blocks.
100 brls. Wire.

January 8, s. s. "Minnehaha,"
New York to London.

45 pkgs. Casings.
2347 pgs. Lead.
1664 bars, 2534 pgs. Copper.
699 pkgs. Hardware, Wood and Metal Ware.
52 pgs. Electrical Goods.
91 pkgs. Machinery.
444 pkgs. Sewing Machines.
504 pkgs. Handles, Spokes, &c.
1155 plates, 4627 slabs Spelter.

99 pkgs. Wringers.
5 pkgs. Crucibles.
10 pkgs. Machinery.
27 cs. Copper.
80 pkgs. B. Lead.
4 pkgs. Wagons.
8 pkgs. Firearms.
65 Cycles and Fittings.
8 pkgs. Agricultural Implements.

118 pcs. Trolley Poles.
667 pkgs. Iron Pipe, &c.
158 pkgs. Typewriters.
165 pkgs. Cash Registers.
633 kgs. Horseshoes.
747 pkgs. Radiators.
78 brls. Iron.
6 pkgs. Motor Cycles.
16 pkgs. Oil Stoves.
1000 brls. Maple Flooring.
69 pkgs. Hardware, Wood and Metal Ware.
17 pkgs. Pumps.
28 pkgs. Machinery.
1125 brls. Maple Flooring.

January 8, s. s. "Bohemian,"
New York to Liverpool.

2 pkgs. Hardware.
34 pkgs. Machinery.
148 cs. Handles.
13 pkgs. Iron Pipe Fittings.
864 slbs. Spelter.
59 brls. Zinc Dross.
6 pkgs. Glassware.
4 pkgs. Crucibles.
5 brls., 657 slabs Zinc.
25 cs. Celluloid.
32 brs. Typewriters.
20 brls. Wire.

January 8, s. s. "Sachem,"
Boston to Liverpool.

20 pkgs. Machinery.
231 pkgs. Nails.
271 pkgs. Woodware.

January 7, s. s. "Hindoo,"
Boston to Hull.

66 pkgs. Machinery.
At New York.
13 pkgs. Castings.
35 brls. Wire.
4 pkgs. Emery.
12 cs. Typewriters.
5 cs. Files.
12 cs., 187 pkgs. Hardware.
1 crt., 100 brs. Stoves.
290 bgs. Asbestos.
26 cs. Agricultural Implements.
11 cs. Cycle Parts.
484 pkgs. Machinery.

January 9, s. s. "St. Paul,"
New York to Southampton.

435 pkgs. Hardware.
92 pkgs. Machinery.
156 pkgs. Typewriters.
636 bars, 9 brs. Silver.

January 9, s. s. "Celtic,"
New York to Liverpool.

110 Iron Drums.
48 pkgs. Casings.
6116 pgs. Lead.
277 brls. Copper Matte.
10,262 pgs., 4117 bars Copper.
8 pkgs. Machinery.
6 pcs. Iron Pipe.
26 pcs. Iron Pillars.
21 pkgs. Bolts.
21 brls. Wood.
255 brls. Iron.
8 Car Trucks.

January 9, s. s. "Majestic,"
New York to Liverpool.

181 pkgs. Machinery.
19 pkgs. Plows, &c.
9 pkgs. Machinery.
33 pkgs. Lamps.
110 pkgs. Hardware.
102 Steel Motor Castings.
76 Car Wheels.
4 pkgs. Valves.

January 9, s. s. "Irishman,"
Boston to Liverpool.

200 brs. Wire.
254 pkgs. Machinery.
1756 brls., 16,798 pcs. Hardwood Lumber.

January 7, s. s. "Boston City," New York to Bristol.

52 bxs. Nails.
10 cks. Copper Matte.
4 crts. Wheels.
655 bags Nails.
19 pkgs. Castings.
9 pkgs. Handles, 19 cs. Spokes.

15 cs. Spokes and Hubs.
70 pkgs. Machinery.

January 11, s. s. "Ibernian," Boston to London.

15 brls. Copperas.
10 pkgs. Tools.
6 Laundry Machinery.
9 pkgs. Machinery.
50 bxs. Typewriters.
1 bx. Typewriter parts.

January 13, s. s. "Bostonian," Boston to London.

31 pkgs. Blowers.
41 pkgs. Radiators.
67 pkgs. Machinery.
67 bds. Scrap Ivory.
2590 ps. Mangle Rollers.

January 14, s. s. "Evangeline," St. John, N. B., to London.

17 pkgs. Old Metal.
5111 pcs. Deal Ends.
3878 pcs. Plank and Ends.
600 pkgs. Blocks.

January 13, s. s. "Umbria," New York to Liverpool.

9 pkgs. Lamps.
277 pkgs. Electrical Goods.
25 pkgs. Machinery.
57 pkgs. Agricultural Machinery.

63 cs. Handles.
144 bars Silver.
2 bxs. Gold Bricks and Dust.
11 pkgs. Forks.
395 pkgs. Hardware, &c.
53 pkgs. and pcs. Windmills.
5 cs., 68 crates Wood Pulleys.
2276 plates Copper.
540 slabs, 7 brls. Zinc Dross.
10 reels Wire.
12 pkgs. Castings.
20 pkgs. Wringers.
16 cs. Pipes.
40 pkgs. Wheels.
10 pkgs. Spokes, &c.
137 bxs. Wire.
14 pcs. Iron Pipe.
64 bds. Hoops.
350 crts. Oil Stoves.
5 pkgs. Motors.

January 13, s. s. "Devonian," Boston to Liverpool.

157 pkgs. Machinery.
8 pkgs. Hardware.
19 brls. Wire.
6 cs. Typewriters.
20 bxs. Nails.

January 13, s. s. "Indore," Baltimore to Liverpool.

15 crts. Wheels.
6624 bars, 28 cakes Copper.
13 brls. Nested Ware.
16 pkgs. Implements.
6023 ingots Copper.
204 bgs., 11 cs. Wire Nails.
51 brls. Zinc Ashes.
10 bxs. Wood Work.

January 15, s. s. "Mackinaw," Philadelphia to London.

214 pkgs. Wheels.
91 brls., 66 cks. Zinc Dross.
178 pkgs. Agricultural Implements.

January 13, s. s. "Toronto," New York to Hull.

80 pkgs. Machinery.
39 pcs., 14 bds. Ironware.
444 pkgs. Hardware.
5 pkgs., 7 brls. Agricultural Implements.

12 pkgs. Pumps.
12 pkgs. Typewriters and parts.

25 pkgs. Graphophones.
46 cs. Handles.
9 bxs. Typewriters.
400 crts. Heaters.

January 16, s. s. "North Point," Philadelphia to London.

26 pkgs. Glass.
3 cars Slate.
41 rolls Wire Fencing.
56 cs. Skewers.
273 cs. Hardware.

January 14, s. s. "Chicago City," New York to Bristol.

45 bxs. Nails.
20 cs. Tinfoil.
37 cs. Hardware.
12 pkgs. Moldings.
7 crts. Wheels.
14 pkgs. Motor Trucks.
30 cs. Electrical Goods and Castings.
25 bxs. Wire.
10 pkgs. Oil Heaters.
28 reels Copper Wire.
10 cs. Hubs and Spokes.

will be observed that so far as price is concerned the rates between New York and Brazil are much more advantageous than from Europe. It is not so much then a case of price as of actual mechanical facilities:

To	Average rate of steamer freight.	Remarks.
London	27s. 6d. to 30s.	
Liverpool	25 shillings	Per ton, Bahia scale.
Hamburg	30 marks	
Antwerp	25 shillings	
Havre	30 francs	Havre scale.
Bordeaux	30 francs	
Marseilles	30 francs	
Genoa	35 francs	Havre scale for co-coa; coffee at 1000 kilos to the ton.
Leghorn	40 francs	
Naples	40 francs	
Trieste	45 francs	
New York—		
Cocoa	55c. and 5 p.c.	
Coffee	50c. and 5 p.c.	
Hides	38 shillings	Per 650 kilos.
Wood	30 shillings	Per 1000 kilos.

Trade with Switzerland.

Recently, on my way to Austria, I spent some days in Switzerland, particularly in the German cantons, and could not fail to be impressed with the trade possibilities of this very prosperous and thrifty country. It is, however, difficult to advise how the trade is to be obtained. Two facts, however, are clear: 1. If the Swiss merchants are to be approached, it must be by competent commercial travelers, and 2, by the appointment of agents of Swiss nationality, with ample powers of representation. As travelers have to take out a license, it is easy to ascertain how many visited Switzerland last year. Here is an analysis of the trades represented by the travelers:

	No. of commercial travelers.
Representing firms selling articles of food.....	9,444
Representing various textile industries.....	5,938
Representing the metal industries.....	1,732
Representing firms selling chemical products, drugs, perfumery, &c.....	1,380
Representing the watch and jewelry trades.....	631

The popularity of the chief Swiss towns from the viewpoint of the traveler is shown by the following table, giving the number in each town:

Town.	No. of commercial travelers.
Basle	3,443
Zurich	3,333
Geneva	2,537
St. Gall	1,000
Berne	859
Lucerne	679
Winterthur	614
Lausanne	613

Germany does the lion's share of the Swiss trade, amounting in all to close upon \$30,000,000 worth per year. France comes second with nearly \$13,000,000, Great Britain \$9,000,000, Austria \$4,300,000, and the United States \$2,700,000. Of course mere continuity gives Germany an enormous advantage, particularly as the German cantons are more distinctively industrial than the French or Italian. Personally, I see no reason why America should not approach the figures achieved by Great Britain. So far as metal goods are concerned, the following are in demand in Switzerland. With the total imports I also append the value of the imports from Great Britain by way of a guide, showing what America may do:

ALUMINUM, ZINC, TIN AND LEAD GOODS.—(Total imports, \$2,010,000.)—Imports from the United Kingdom, \$200,000; increase, \$65,000. This increase is accounted for in the imports of Tin in bars, which amounted to \$190,000, an increase of \$65,000 on the previous year.

IRON AND WIRE GOODS.—(Total imports, \$15,125,000.)—Imports from the United Kingdom, \$2,510,000; increase \$343,500. Principal increases: Pig iron (\$320,000), and sheet iron, tinned, under 1-16 inch (\$110,000). Principal decreases: Rails and Rolled Wire (\$60,000), and coarse cast iron ware (\$30,000). The imports from the United Kingdom show an increase of \$340,000, while the imports from the following countries show a decrease: Germany, \$585,000, and the United States, \$340,000. The principal items of which Germany sent less were sheet iron, \$185,000; forged iron goods, \$290,000; rough piping, \$90,000, and cast iron ware, \$65,000. The decrease in imports from the United States is accounted for as follows: Rough piping, \$290,000, and forged iron goods, \$60,000.

More About South America.

A few weeks ago I referred in great detail to the extent of the English and German Hardware trade in the Argentine Republic. My readers may remember that it was made clear that England has still a great preponderance of the Hardware and metal trades in South America. Apropos of this, the following figures will illustrate how Europe still holds the trade in the Republic of Chile, but in this instance the preponderating influence is Germany and not England. I have extracted the total imports in value of the goods specified, and given with each total the exact share of Great Britain and Germany. I may perhaps remark that the value of a peso is 1 shilling 6 pence in English currency and 36 cents American:

Imports Into Chile.

	Value.		
	Total Import.	British Share.	German Share.
	Pesos.	Pesos.	Pesos.
Enameled Ironware.....	532,100	56,600	426,000
Wire Nails.....	245,300	10,400	179,500
Iron Nails.....	545,000	43,000	105,800
Machinery Beltings.....	255,500	99,400	137,200
Assorted Glassware.....	848,900	80,100	608,500
Lamps and Chandellers.....	68,600	2,900	47,300
Industrial Machinery.....	623,500	83,900	242,900
Sewing Machines.....	316,000	6,700	243,700
Electric Lighting and Traction Machinery.....	1,217,000	123,900	1,046,000
Paint, fine powder and dry.....	74,300	3,276	60,700
Iron Tacks.....	47,000	5,700	4,200
Zinc Sheets.....	107,600	7,500	69,200
Zinc Bars.....	47,300	2,500	31,000

The moral of these figures is that if the United States is to obtain a fair share of trade in South America greater shipping facilities are imperative and urgent. There can be no shadow of doubt that the completion of the Nicaraguan Canal would open up the trade of Chile to an enormous extent with the Eastern States. It is difficult to arrive at anything like a true relative valuation of the freights to South America, but I have recently lighted upon some quotations as between Bahia, in Brazil, and European ports, as compared with New York. It

The British Hardware Market.

As already indicated, the year has opened badly for the Hardware trade. Export orders are still the great standby, business being fair with Australia, New Zealand and some of the eastern countries. Indents from the Cape Colony show slight improvement, but rather more in the heavy goods than in light Hardware. Trade with the West Indies shows a slight improvement, and although trade with the United States is falling off seriously (what is left of it), orders from Canada are coming in fairly well. There is an exceptionally heavy demand just now for Steel Traps, required to deal with the vermin trouble in different parts of the world, and especially in Australia. Some orders are also in for Traps for large animals. Mills for grinding corn and other articles are selling well, both in the English agricultural districts and on overseas account.

The Edged Tool trade still continues active, and makers of Horseshoes are at the present moment busy. Galvanized iron manufacturers are a little anxious, consumers holding off hoping to secure reduced prices. The light iron founders have received quite a number of export orders for Tinned Hollow Ware, and the japanning trade is busy on season orders. So far as India is concerned, there is a scarcity of orders from the famine zone, but the requirements of the Government continue on a large scale, and the development of manufacturing industries in Calcutta and Bombay necessitates the importation of large quantities of Tools and materials. Hoes and other Cultivating Tools are at the present moment being sold in good quantities for the tea and indigo plantations in India and Ceylon, as also are Pipes and other irrigating appliances.

The trade with France is improving to an appreciable extent, and Germany is ordering slightly more than she has done during the past six months. Manufacturers of the plainest kinds of Hardware are just now doing well with Egypt. This trade is naturally stimulated by the opening up of new markets in the Soudan. The new Quetta route to Persia, which I have already commented upon, is turning out satisfactory, and a considerable expansion of Hardware business is being done with the southern portion of the Shah's dominion.

There is a marked scarcity of employment in the Builders' Ironmongery, Cast Hollow Ware and Agricultural Implement trades, but the sale of Nuts and Bolts for export trade continues good. The cabinet brass foundry trade, particularly Stair Rods, Fender Fittings, Lamp and Cornice Tubes, shows a marked improvement, but in the best cast work there is practically nothing doing, stamped and machine made work gradually beating out the hand made products. Makers of Spades, Shovels, Forks, &c., are fairly busy on home account, but their export trade shows a lull. There is a continued good demand for Hurdle and Fencing, but the depression among common Lock makers continues. As I stated three weeks ago, there is a good demand for Locks of better quality.

In the Cutlery trade one interesting fact has come to light. Spain is beginning now to make its own Cutlery, another firm of manufacturing cutlers having been started. It is also stated that German firms are pirating very freely some of the oldest and best known marks of Sheffield Cutlery houses and selling them in Spain. There is, for example, a middle class Pocket Knife that has been selling in Spain for over 100 years, but the Germans have adopted the mark and are putting it on the market with disastrous results to the Sheffield houses. American Cutlery houses seeking to do trade with Spain should not only see that their marks are registered in Spain, but go further and see that their registered marks are respected. In point of fact, the mark of the Sheffield firm to which I have referred is also registered in Spain, but legal action will be necessary to enforce the Sheffield firm's rights.

DEATH OF C. K. TURNER.

C. K. TURNER of C. K. Turner & Son, 74-76 Broad street, New York, manufacturers' representatives for export, died at New Bedford, Mass., January 5, of acute Bright's disease. He left New York the 2d inst.

by the Fall River Line, and on the train from Fall River was seized with a convulsion, which later resulted in his death at the Parker House, New Bedford. This business which has been established for years was incorporated February, 1901, as C. K. Turner & Son. Mr. Turner since that date and for a previous period depended largely on his son, F. C. Turner, who has been associated with him almost since the business was started. The business will be carried on along the same lines, representing American manufacturers of Hardware and kindred goods among the export commission houses in New York, Boston and Philadelphia.

AMERICAN TRADING COMPANY.

FLINT, EDDY & AMERICAN TRADING COMPANY, New York, announce that on and after February 1, 1902, they will do business under the name of American Trading Company. They will continue all the departments of their business as heretofore, and there will be no change in the present experienced management. While the American Trading Company were for many years identified with Eastern trade, Flint, Eddy & American Trading Company, under their new single name of American Trading Company, will, in addition to the business with China, Japan, Corea and Siberia, continue to do an export and import trade with the Philippines, Australia, New Zealand and Africa, and with all the markets of South America, Central America, Mexico and the West Indies.

The company report that trade has been somewhat checked in South American countries by the disturbances there, but that it is on a sound basis in most of them. Australian business is referred to as still good, and it is hoped that the drought in some of the colonies will not affect it seriously. South African business is said to be steadily improving, many new and important lines going there as a result of the war. America was called upon for articles for army use which have now become staple and have entered into the commerce of the country. There is a continual increase in the Philippines in the demand for American manufactures. The method of introduction seems to be first, the use by the soldier, followed by the use by the native. The company refer to matters in China as rapidly adjusting themselves, while Japan's commercial crisis seems to be past.

EXPORT NOTES.

Beeche, Duval & Co., 25-33 Broad street, New York, and Valparaiso, Chile, have had turned over to them by D. Enrique Budge, Commissioner-General of Chile's Commission to the Buffalo Pan-American Exposition, a number of copies of a volume entitled "Chile at the Pan-American Exposition," with notes on Chile and a general catalogue of the Chile exhibit. It is a volume of 252 pages, each 7½ x 10½ inches, profusely illustrated with views of leading cities in Chile, streets, buildings, parks, &c., as well as features of their exhibit, with descriptive matter of value to those interested in this progressive South American country. While the edition holds out copies will be delivered to those who send for them, or mailed on receipt of 17 cents postage each.

John G. Rollins & Co., Limited, 4 Stone street, New York, and Old Swan Wharf, London, England, have taken over the sole selling agency of Edward Miller & Co., Meriden, Conn., and 28-30 West Broadway, New York, for all the countries of the United Kingdom, France, Holland, Belgium and Switzerland. The latter company are well known as manufacturers of large lines of all kinds of Lamps, Heaters and kindred lines, and were for years the manufacturers under contract of the Rochester Lamp.

Mueller, Larsen & Co., Mt. Hope, Kan., have succeeded Kantz, Larsen & Co., dealers in Hardware and Farm Implements, and F. W. Mueller, dealer in Harness and Bicycles. The new firm have added 40 feet to the length of their establishment and have put in rolling ladders and new cases and generally improved the store.

EFFICIENCY IN STORE MANAGEMENT.

THIS is a story of how money has been saved in the administration of a large business by spending it, paradoxical as it seems. Not the least factor in the proceeding, however, has been the introduction of new ideas and a considerable energy. The new leaf was turned four years ago, at which time S. S. Bradley, formerly of Duluth, Minn., was made manager. The introduction and systematizing of new and practical ideas have accomplished a saving of from \$15,000 to \$20,000 in the yearly cost of conducting the business, the volume of which exceeds a half million dollars per annum. The business of Patterson, Gottfried & Hunter, 146-150 Centre street, New York, dealers in Machinery, Metals and Supplies for factories, mills and kindred manufacturing purposes, Builders' and Cabinet Hardware, Machinists', Carpenters', Blacksmiths' and Contractors' Tools, &c., was established in 1879 by H. T. Patterson, who has always been the life of the business.

A peculiarity of the business is the number of small transactions, which average about 1000 a day. Like some cities, the growth has been so rapid that there never seemed to be just the right time to properly organize the departments and multitudinous details on more advantageous lines. The company's successful business existence depends entirely on the ability to supply manufacturers with reasonable promptness with such supplies as are used in manufacturing, whether in the way of Tools or materials.

One of the First Changes.

One of the first undertakings under the new régime was to arrange the departments and stocks harmoniously, so that they bore some logical relation to each other rather than being detached and scattered, the rapid growth of the business having resulted in putting new lines of goods wherever opportunity offered.

Sorting Scrap.

A governing principle is above all things to keep stocks clean and bright and free the floors from top to cellar of dirt and rubbish. Instead of selling scrap for a pittance it was sorted out, in time that would not be otherwise employed. For example, the concern carry one of the largest retail Screw stocks in the United States, and there came to be much waste in the scattering of Screws which were sometimes sold at an average of, say, \$5 a keg. The new method has been to sort the Screws, for which new boxes were obtained from the manufacturers, and as a result there was realized in one year \$2700 net, and at no additional labor cost. Incidentally, it is apparent that such sorting out processes soon cure many of the careless habits incidental to handling large volumes of supplies.

Insurance Premium Reductions.

Another leak was discovered in the form of insurance penalties for both negative and positive faults; they were penalized for a canvas ceiling, which for some reason was in the building, and for a better reason was removed and replaced with one of metal, saving the house 1 per cent. in premium. Another fault, from the fire underwriters' standpoint, was an antiquated cash carrier which necessitated holes in the floors, which to an insurance inspector means a good chimney in case of fire. This was reformed by the installation of modern pneumatic Tubes of greater efficiency, effecting another saving of 1 per cent.

Unsalable Sizes Exchanged.

The stocks were exhaustively gone over and sorted, one result of which was to discover many unsalable sizes, some of which were returned or exchanged, especial attention being given to the working off of dead stock to the best advantage.

Telephone Extensions.

As an important element of the business is dispatch, they put in a switchboard, and added enough trunk line wires to make five in all, with 20 extensions, so that every one having use for a 'phone had it on his desk, or in the department, where formerly they had one 'phone on the street floor and one in the office on the next floor

above. Under the old system there were sometimes, say, four or five clerks waiting for the usually busy line. This venture costs them \$120 a month, but they have found the telephone orders aggregate more than through all their city salesmen. Naturally, much of the 'phone business is directly traceable to the salesmen's efforts, but the rapidity with which the orders can be placed has brought them much trade because of the ease with which it can be done. Another "extravagance" is in the installation of pneumatic Tubes that carry messages, which saves the continual expense of two messenger boys, at the same time giving a more rapid service.

Better Environment for Employees.

Believing that an interest in the employees, of which there are about 125, and a better environment brings better returns, a marked change was effected in dressing and coat rooms; more suitable places for luncheon, especially for the young women; the gain being apparent in a better grade of work and the obtaining of a higher class of employees.

Average of Unfinished Business Reduced.

One result of the various changes, some of which we have alluded to, has been to reduce the volume of unfinished business from an average of five days to an average of two days, while the improvement and increased service to customers is very apparent. Another outcome is a reduced pay roll of about \$200 per week in this item alone.

Automatic Register.

In a business of such character the arriving and departing time of the help is of importance. The old way was to have a man as time keeper; now they have an automatic time register, which knows neither friend nor foe, but automatically records the time of the coming and going of every one. By this system a total of 15 minutes is allowed every one for lateness in a week, beyond which is a penalty of 1 cent a minute, to which there is a limit, chronic offenders not being tolerated. The clock is said to have paid for itself in the first six weeks.

The Prevention of Stealing.

The offices, one flight up, have been rearranged so that they get an increased area of 1200 square feet floor space on that level for handling merchandise. Throughout the various floors, the selling counters have been so placed that customers cannot easily get among the stock, at the same time placing the counters near the windows where a better light is offered. In one year 17 outsiders and 20 employees were caught stealing goods. Now the more valuable articles are kept in the open rather than in remoter places, to make pilfering more difficult or impossible. Along the same lines clothing is hung up in the coat rooms, and at going out time a man is in charge to prevent, if possible, goods being taken away.

Rearranging Stocks.

The stocks have been thoroughly gone over and rearranged. Heavy goods are stored over girders, where more of such material can safely be carried. Immense stocks of Screws, Bolts, &c., of almost every kind are carried in bins and arranged and labeled according to the list, and in the main in such a way that the commoner sizes are the most accessible. Racks for Tool Steel, Iron, Brass and other metals have been built, one result of which is to make the material easier to get at, while showing the amount of stock on hand, approximately, at a glance. In one such instance of reconstructing a rack for Tool Steel \$700 worth of material was brought to light that for all practical purposes did not exist. The labels are white and in metal bound frames with rounded corners, about 2½ x 3 inches in dimensions, the stenciled card surface being shellaced to prevent soiling, which when necessary can be washed.

Time and Labor Saving Device.

The cutting off of lengths of metal is constantly being done. Formerly this was accomplished by hand, which took much of the time of both help and customer; now the cutting is by power, the metal being put in position and automatically cut while the clerk in most in-

stances can be attending to something else. The floors are sprinkled and swept every day and kept in neat condition.

Order Handling Methods.

The manager is at his desk at 7.30 a.m. every day to properly start the day's business. All orders are edited—that is, placed on uniform blanks that show all the necessary details of address, shipping directions, credits and anything necessary that can be anticipated. Orders of a local character are on yellow paper and numbered from 1 to 10,000 inclusive. Foreign orders are on blue paper, from 10,001 to 20,000 inclusive, so that either the number or color of a blank indicates its character at sight.

Office Helps.

There are numerous office helps in the way of card indexes and similar labor saving devices. One system concentrates all the unfinished business in a cabinet of drawers for that purpose, the central feature of which is that in a numbered portfolio (of thick manila paper) corresponding with the original order all unfinished correspondence is kept until finally disposed of, when the accumulated letters, postal cards, telegrams, or any form of communication, go into the regular files. For example, if goods have been ordered for a back order, the details of the transaction are kept in this portfolio, replies of manufacturers acknowledging receipt of orders, or any observations they may make from time to time in connection with that transaction, so that an authentic record is instantly available to intelligently answer the customer's inquiry relating to any unfinished business. An order for anything not in stock is instantly thrown into the buyer's department. About 40 per cent. of the business of the house goes through the store, and the remaining 60 per cent. direct in factory shipments, the concern controlling many of the goods they deal in for specified territory.

Circularizing the Trade.

They have a comprehensive system of reaching the trade with literature, circulars and sometimes samples, which includes a total of 32,000 names, the list being frequently revised and kept alive; the various concerns being reached in one way and another on an average of once in three months at least.

Throwing Out Dead Wood.

Naturally in the various changes in the period under discussion there were developed numbers of unsympathetic clerks and employees. To such as manifested a desire to grow with the system opportunities were given; those who were not willing to accommodate themselves to changed conditions were replaced by more suitable material.

A MARYLAND MERCHANT'S CATALOGUE.

Samuel Emmert, retailer and jobber of General Hardware and Farm Machinery, Hagerstown, Md., has issued an illustrated catalogue which gives an excellent idea of the extent and variety of his stock. It is a book of nearly 200 pages, and contains an index to facilitate reference to its contents. Mr. Emmert advises us that 3000 copies of the catalogue have been printed, which have been mailed to merchants to whom he sells, as well as to blacksmiths, contractors and farmers. No mention of prices is made in the book, but Mr. Emmert reminds his patrons that his prices are uniformly low, and that only first-class goods are carried, his aim being to have always on hand a complete assortment so as to fill orders promptly.

PENNSYLVANIA CHAIN COMPANY.

THE PENNSYLVANIA CHAIN COMPANY have organized at Harrisburg, Pa., with a capital of \$50,000. The following are the officers and directors of the company: General Thomas J. Stewart, president; Dr. A. I. Miller, vice-president; B. W. Demming, treasurer; Chas. D. Stucker, secretary and general manager, and Geo. D. Stucker. C. D. Stucker, secretary and general manager, was for nine years connected with the South Harrisburg Chain Works, and is referred to as thorough-

ly familiar with the business. The company have not yet selected their site, but have accepted plans for an 80-fire plant, and will make high grade chains. A testing plant will be installed in the works.

AMONG THE HARDWARE TRADE.

A. M. Smith, dealer in Hardware, Stoves, Agricultural Implements, Sporting Goods, &c., Chapman, Neb., has disposed of his business to John McCormick.

C. M. Moore is successor to Barnes & Moore in the Hardware, Stove and Sporting Goods business in Comanche, Texas.

MacLennan & Nelson are successors to MacLennan & Graham in the Hardware and Stove business in Bemidji, Minn. The firm do both a wholesale and retail business and have recently taken possession of new quarters.

M. J. Finch has sold out his Hardware store in Hawarden, Iowa, to W. H. Wilkinson, who continues at the old stand. Mr. Wilkinson's line embraces Hardware, Stoves and Tinware, Plumbing, &c. He has added considerable new stock.

W. J. Meyer has succeeded Covell & Son, Idana, Kan., dealers in Shelf and Heavy Hardware, Stoves, Tinware, Harness, &c.

The Hardware store of L. Waldo Thompson, Woburn, Mass., was destroyed by fire a short time since. The loss on building was \$10,000; on stock, \$12,500.

A. C. Rickly & Co., who lately embarked in the Hardware, Stove, Tinware, Farm Implement and Sporting Goods business in Hobart, O. T., are expecting soon to erect an addition to their store in view of the growth of their trade.

Rouch Bros. have opened up in business at Dover, O. T., handling Shelf and Heavy Hardware, Stoves and Tinware, Farming Implements, Sporting Goods, &c. They occupy a new brick building erected especially for their business.

The Orange Hardware Company, Orange, Va., on November 18 last disposed of their entire stock of Hardware, Building Material, Stoves, Agricultural Implements, Vehicles and Harness to the Greiner-Ricketts Hardware Company, who continue at the old stand.

Charles Reisinger, for several years with the James C. Lindsay Hardware Company, Pittsburgh, Pa., has bought out the Hardware business of Frazier & Smith, 1236 Liberty street, Franklin, Pa. Mr. Reisinger is putting in a new metallic ceiling and new showcases, and making other improvements. He will carry a full retail stock of Hardware and also job plumbing goods. The business will be conducted under the style of Franklin Hardware Company.

B. S. Prunty has succeeded Prunty & Iseninger in the Hardware, Stove and furniture business at Grimes, Iowa.

TOLEDO TUBE COMPANY.

THE TOLEDO TUBE COMPANY, Toledo, Ohio, for whom J. C. McCarty & Co., 10 Warren street, New York, are representatives, have issued a catalogue showing the line of Shovels, Spades, Scoops and Ditching Tools which they are manufacturing. It covers an assortment of Plain Back and Hollow Back Shovels and Spades, and also a line of Coal Shovels, Railroad Shovels, Grain Scoops, Back Strap Scoops and a variety of Snow Shovels, Telegraph Shovels and Spoons, Drain Cleaners, &c. In presenting this catalogue the manufacturers call attention to the fact that while they are new in the Shovel business they are old in the working of steel, and refer to the quality and finish of their goods.

EIGHTH ANNUAL SPORTSMEN'S SHOW.

THE eighth annual sportsmen's show, under the auspices and management of the National Sportsmen's Association, will be held in Madison Square Garden, New York, from Wednesday, March 5, to Wednesday, March 19, inclusive. The exhibits will include Sportsmen's Camps, Camp Outfits, Guides, Woodsmen and Trappers, Fly Casting, Revolver Competitions, Boats, Launches, Canoes and Marine Motors, Game Animals, Game Birds and Game Fishes, Guns, Rifles, Revolvers, Ammunition, Powder and Shot, Fishing Tackle, Sportsmen's Supplies, Golf Goods, Cameras, Tents, Cabins and Portable Houses, Indian Goods and Indian Camps.

Among the new features of this year's exhibit will be one great wooded island, to occupy the amphitheater, with a trout stream, water falls, cascades and a grand view of the Adirondacks. Upon the island, which will be reached by rustic bridges, there will be walks leading to the big game inclosures. Along the shore will be the camps and cabins of Maine, Adirondack and Canadian guides, equipped and constructed as they are found along the Fulton Chain, Moosehead Lake, the Rangeleys or the St. John. The island will be wooded with pine, hemlock and spruce, and the visitor will tread earth, moss and rocks as in the woods.

Upon the stream visitors can enjoy a canoe ride with guides and Indians to ply the paddle. At the Fourth avenue end will be the fish exhibit, and in a corresponding position on the north promenade there will be a very valuable collection of birds' eggs and nests, together with mounted specimens of the birds themselves, many of them examples of extinct species. In another section of the Garden will be a display of implements used in all sports of Scotland since the time of Prince Charley, as well as implements of warfare and of the chase. In the center of the display will be a perfect reproduction, 10 x 20 feet in area and 14 feet high, of the home of Sir Walter Scott's "Fair Maid of Perth."

Another attraction this year will be a party of typical Long Island baymen, with their duck shooting hut and a complete duck hunting outfit. Exhibitions will be given as to how the birds are decoyed and bagged. There are also in course of preparation a number of interesting features connected with sports, the entire amphitheater being reserved for the carrying out of the plans adopted, trade exhibits being confined to the galleries. For further information, plans of the Garden, &c., inquirers can address Capt. J. A. H. Dressel, general manager, 320 Broadway, New York.

JAS. H. BAKER MFG. COMPANY.

H. W. ARMSTRONG, who for more than 20 years has been general manager of the Verona Tool Works, severed his official connection with that firm on the first of the year, to accept the presidency of the Jas. H. Baker Mfg. Company of Pittsburgh and Tarentum, manufacturers of a general line of Forgings, and expects to devote his entire time to the company. He is identified with Jas. H. Baker as vice-president and general manager and H. M. Breckenridge as treasurer. The capital of the Baker Company has been recently increased to \$500,000, and a number of prominent Pittsburgh people are connected with the concern. They expect to take up new lines of Forgings, particularly in the railroad business, as Mr. Armstrong is a graduate of the Pennsylvania Railroad, having served an apprenticeship as machinist, apprentice draftsman and master mechanic. He has also had some experience in the steel business, having been at one time connected with the Crescent Steel Company. Mr. Breckenridge is largely interested in a great many of the industries along the Allegheny River about Tarentum. Mr. Baker is well known as a forgerman and as the originator of the Baker Wagon and Chain Specialties.

W. F. Porterfield has bought the Hardware business at San Rafael, Cal., formerly conducted by W. H. Gilbert.

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Kansas Retail Hardware Dealers' Association.

THE fourth annual convention of the Kansas Retail Hardware Dealers' Association was held at Kansas City, Kan., January 16. The headquarters of the association were in the rooms of the Mercantile Club. On account of the illness of President Anderson there was no prearranged programme, and the session was occupied principally in discussing the best methods of obtaining a larger membership, getting Hardware dealers in the same town to become better acquainted with each other and other questions of interest to the Hardware trade.

Irving A. Sibley, member of the Executive Committee of the National Retail Hardware Dealers' Association, was present at the meeting and delivered a very interesting address on the history and work of the association.

In the absence of the president, Mr. Anderson, Vice-



O. V. ROEHR, President.

president Oscar Roehr presided, and addressed the meeting as follows:

Vice-President's Address.

As presiding officer of this convention the first duty I have is a sad one. It is with extreme sorrow and regret that I announce the severe illness of our president, George Anderson of St. Mary's, Kan. Sorrow for a personal friend and regret that his affliction makes his absence at this meeting unavoidable.

About six months ago Mr. Anderson had an attack of paralysis, which left him entirely helpless. I have a recent letter from his son stating that Mr. Anderson is now unable, and has been for six months, to converse or communicate his ideas in any way, although I believe that his intellect was not affected in the least by the stroke of paralysis which he suffered.

We congratulated ourselves at the last meeting when we elected Mr. Anderson that we had in him an officer eminently equipped for the position, and who had the necessary push and energy to put this equipment into practical use for the benefit of the association. Nor were we mistaken. It was largely through the instrumentality of Mr. Anderson, as the head of our association, that a bill was introduced in our last Legislature licensing peddlers and vendors of certain commodities, the principal item of which as Hardwaremen we were interested in being Stoves and Steel Ranges.

Mr. Anderson was at the Capitol continually while this bill was being debated, and worked unceasingly un-

til the bill was passed and became a law. Undoubtedly he had other measures in mind for the benefit of the association, which his unfortunate illness prevented him from putting into effect. In his absence to-day we miss a friend and benefactor; therefore let us all hope for his speedy recovery and ultimate return to active life.

I regret and rejoice that the year just passed has



E. I. KING, Vice-President.

not shown any material increase in our membership. Regret for the association and rejoicing for the cause of this lack of growth. Our Hardware merchants have undoubtedly had a prosperous year; so prosperous, in fact, that they have had all they could attend to with their immediate business, and as a result interest in association work lagged. The old adage, "Make hay while the sun shines," was never more applicable, for, as surely as night follows day, business depression is bound ultimately to succeed an era of prosperity; and it is at such times, when competition grows hard and merchants



J. A. COLE, Secretary-Treasurer.

are inclined to become aggressive in various ways, that a strong fraternal association at your back is a mighty satisfactory ally.

Personally I have received much pleasure and benefit as a member of this association, and have made many friends whom I prize highly. I feel strongly the honor

I have in presiding at this meeting, and my only regret is that there is not a larger membership present.

We should have with us to-day at least 300 members, and this would only be about one-third of the Hardware merchants of Kansas.

During this convention I will ask for a short session, devoted entirely to the enlarging of our membership. I thank you for your kind and courteous attention, and now declare the fourth annual convention of the Kansas Retail Hardware Dealers' Association open and ready for business.

The minutes of the last meeting were then read and approved. J. A. Cole, Topeka, then presented his report as secretary-treasurer, as follows:

Secretary's Report.

The past year has been an eventful one, and while the Kansas Retail Hardware Dealers' Association has not perhaps prospered to the extent of some of the retail Hardware dealers' associations in other States, we may have had more to contend with, as the general verdict is that business has been very good in Kansas this past year, which means that the live Hardware merchant has been kept busy with his immediate affairs, and had very little time to think of what benefits might be derived from an association with other dealers.

Your secretary has to report that not one complaint has been received from any of our members, neither that the wholesale Hardware houses were selling goods to the consumer nor that the consumers were not buying goods enough from them. Nor has he heard of the Steel Range people peddling their Steel Ranges throughout the State, as he had the year previous. Perhaps the bill which our president worked very hard to get through the Legislature, and finally succeeded in getting it to be one of our laws, may have had some effect toward stopping them.

The bill is as follows:

CHAPTER 271.

REQUIRING PEDDLERS TO TAKE OUT A LICENSE.

An act defining peddlers, requiring them to take out a license, fixing the fee therefor and providing penalties for the violation of this act.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF KANSAS:

Section 1. Whoever shall deal in the selling of patents, patent rights, lightning rods, goods, wares or merchandise, pianos, organs, sewing machines, except patent or other medicines, books, charts, maps and nursery stock, agricultural and horticultural products, including milk, butter, eggs and cheese, by going about from place to place to sell the same, is declared to be a peddler.

Sec. 2. No person shall deal as a peddler without a license, and no two or more persons shall deal under the same license, either as partners, agent or otherwise.

Sec. 3. Every license shall state the manner in which the dealing is carried on, whether on foot or with one or more beasts of burden, the kind of cart, wagon or carriage, or, if on the water, the boat or vessel to be employed.

Sec. 4. Any person may obtain a peddler's license by applying to the County Clerk of the county in which he wishes to carry on his trade and by paying the amount herein provided for said license.

Sec. 5. Each peddler shall pay a license tax for the use and benefit of the county in which he intends to carry on his trade, at the following rates: 1, If the peddler travels on foot and carries his goods on foot, \$3 for every period of six months; 2, If the peddler travels with one or more horses, or other beasts of burden, \$10 for every period of six months; 3, If cart, wagon or other land carriage is used, \$50 for every period of six months; 4, If a boat or other vessel is used, \$100 for every period of six months.

Sec. 6. All sums received by the County Clerk for peddlers' licenses shall be by him deposited with the County Treasurer and covered into the county general fund for the use of the county.

Sec. 7. Any person who shall be found dealing as a peddler without having paid for and received the license herein specified, or who shall, upon the demand of any sheriff, constable or any householder of the county, refuse to produce his license and permit the same to be read, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than \$1 nor more than \$100.

Sec. 8. The provisions of this act shall not apply to

the selling or peddling of any goods by the owner or his agent in any county in which the *bona fide* owner or agent is a resident tax payer, or in any county immediately adjoining thereto, where such goods are sold or peddled by the owner or from the store or place of business in which the owner keeps a stock of the same kind of goods that are so sold or peddled; and the provisions of this act shall not apply to traveling salesmen doing business with retail merchants, manufacturers or jobbers, or with State, county, township and city officials, whether they carry samples or not; and nothing contained in this act shall be deemed to conflict with or modify the provisions of section 1 of chapter 157 of the session laws of 1897.

Sec. 9. This act shall take effect and be in force from and after its publication in the statute book.

Approved March 2, 1901.

I do not hesitate in saying that this peddlers' license bill would not have been passed last winter had it not been for the untiring efforts of Mr. Anderson, and if it does what we hope and intend it should do the Kansas Retail Hardware Dealers' Association may congratulate themselves, and thank Mr. Anderson that the results of the past year have been by far the best of any so far in our history and something to be proud of.

Committee on Resolutions.

The following Committee on Resolutions was appointed by the chair: Jos. H. Hamilton, Arkansas City, Kan.; T. H. Kinlry, Beloit; F. W. Bartlett, Kansas City, Kan. The committee reported the following resolution:

Resolved, That it is with great sorrow that we learn of the sad affliction to our president, George Anderson of St. Mary's, Kan., and extend to him our heartfelt condolence and hope for his speedy recovery.

The association extended their sincere thanks to the Mercantile Club for the use of their very comfortable rooms for the meeting.

The secretary was instructed to send out a circular letter to all retail Hardware dealers in the State and try and interest them in the association.

Election of Officers.

The following officers were elected for the ensuing year:

PRESIDENT, Oscar Roehr, Topeka.
VICE-PRESIDENT, E. I. King, Logan.
SECRETARY AND TREASURER, J. A. Cole, Topeka.

EXECUTIVE COMMITTEE:

F. W. Bartlett, Kansas City.
T. H. Kinlry, Beloit.
J. M. Walters, Robinson.
Jos. H. Hamilton, Arkansas City.
T. J. O'Neill, Osage City.

PRICE-LISTS, CIRCULARS, &c.

NORTH BROS. MFG. COMPANY, Philadelphia: A neatly printed pamphlet devoted to their line of Ice Cream Freezers, &c., for 1902. It shows their Lightning, Gem and Blizzard Freezers, and calls special attention to their extensive variety of large size Freezers for confectioners, hotels, restaurants, &c., including the double action Crown and Jumbo Lightning, with crank, fly wheel or pulley, and the 40-quart machine Freezer, for power and hand. The pamphlet also describes the Rapid Ice Breaker, Lightning and Crown Ice Chippers and Gem Ice Shave. Another pamphlet is devoted to the description of their well-known line of Yankee Tools.

J. B. CARROLL, 36 La Salle street, Chicago: An illustration of a night scene in winter, calling attention to the fact that on winter nights the lights burn longer and a good burner asserts itself. This leads up to a consideration of the good points of the Hahn Acetylene Gas Burner. This Burner is manufactured and sold by Mr. Carroll, each part being produced by machinery especially designed for the purpose, and the assembling is done by trained workmen.

SAVAGE ARMS COMPANY, Utica, N. Y.: Catalogue of high grade Hammerless Military, Sporting Rifles, Carbines, Metallic Ammunition, &c. Announcement is made that the new Savage Magazine Rifle, .22 caliber, is now being manufactured and will be ready for delivery some time in March.

CORTLAND DOOR & WINDOW SCREEN COMPANY, Cort-

land, N. Y.: Catalogue showing their line for 1902, including Cortland Plain, Fancy and Fancy Spindle Doors, and Champion, Climax, Automatic and Cortland's Victor Ball Bearing Window Screens. They also make a specialty of hand painted landscape Door and Window Screens, the painting being done after the Door or Window Screen is finished.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

F. G. Belden & Co., formerly of Barker & Belden, Pittsfield, Mass., have recently commenced business as dealers in Hardware, Bicycles, Sporting Goods, Paints and Oils, &c., and request catalogues and price-lists relating to these lines.

Stockdell-Myers Company, Petersburg, Va., have just been organized for the purpose of carrying on the wholesale and retail business in Hardware, Mill and Builders' Supplies, Boilers, Engines and Threshing Machinery. They have an authorized capital of \$25,000, of which \$10,000 has been paid in. The following are the officers and directors of the company: John Y. Stockdell, president; H. Carter Myers, secretary and treasurer; T. F. Heath, R. S. Gill, W. L. Davis, H. C. Myers and J. Y. Stockdell. The members of the company are all young men who have been identified with the Hardware and Mill Supply trade of Petersburg and vicinity for some years. The new company will be pleased to receive catalogues and other printed matter relating to the above lines.

H. M. Bailey, secretary of the Mayberry Hardware Company, Birmingham, Ala., will shortly open a wholesale and retail establishment in Sheffield, Ala., and will be pleased to hear from manufacturers with copies of catalogues, price-lists, &c.

John J. Olewine, who was 23 years with the Potter Hardware Company, previously James Harris & Co., Bellefonte, Pa., has bought out the firm of Daniel Irvin's Sons, in the same city. It is Mr. Olewine's intention to carry as complete a stock as any retail Hardware house in Central Pennsylvania.

EASTERN BOLT & NUT COMPANY.

THE buildings which have been in course of erection for the Eastern Bolt & Nut Company, Providence, R. I., are now completed; machinery of the latest design is being installed, and the company hope to begin operations on or before March 1. They propose manufacturing Bolts of all descriptions, Nuts, Washers, Machine Screws (milled), Cold Punchings, Iron Work for buildings, bridges and electrical construction, and to deal in Turnbuckles, Wrenches, Eye Bolts and such other articles as are akin to their manufactured lines. The following are the officers of the new company, who have been incorporated with a capital stock of \$100,000: E. A. Smith, president; Lincoln Davis, vice-president and general manager, and Geo. C. Bell, secretary and treasurer. The cost of buildings, machinery, land, &c., approximates \$60,000. The main building is 250 feet long, one story high, brick and steel construction, truss roof, 50 feet span, 10 feet bays, mullioned windows with transom in each bay. The power is supplied by a 75 horse-power Corliss engine and two horizontal Dillon boilers, 70 horse-power each. There is also an office and shipping room, two stories. The buildings are steam heated and electrically lighted. The company occupy 5 acres of land on line of the N. Y., N. H. & H. R. R., and intend to put in a spur track. The general arrangement of the plant, they advise us, is such as to secure the greatest economy in handling material.

TRADE ITEMS.

THE HOOPESTON HORSE NAIL COMPANY will be the name of the corporation organized to operate the Superior Horse Nail factory to be removed from Kankakee to Hoopeton, Ill. The company will at first manufacture Horse Nails only, but expect in time to add machinery for the manufacture of Toe Calks.

KELLEY, MAUS & Co., Heavy Hardware jobbers, have found their quarters at Lake street and Fifth avenue, Chicago, much too small for their increasing business and are seeking a new location, which will not only give them rail and water connections, but at the same time will afford room for the erection of a large building specially adapted to their requirements. They have several properties in view and hope to be able to make definite arrangements very shortly.

UNDER date of the 22d inst., Cincinnati Pump Company announce that they have purchased the entire plant of the Bucket Pump Company, and with additional machinery are now in a position to execute orders more promptly and advantageously. The works have recently been moved to Liberty and Clay streets.

W. R. McCULLOUGH, 100 Chambers street, New York, who for many years had charge of Turner, Day & Woolworth Mfg. Company's Hickory Handle business in this city, as export and Eastern manager, has, since his retirement from their employ, connected himself as a stockholder with I. F. Force Handle Company, New Albany, Ind. He will hereafter represent them and market their line of Hickory Handles for axe, adze, pick, sledge, hatchet, hammer and mining tools, &c. This company were established in 1848, and manufacture a large line of this class of Handles. He also continues as heretofore to represent the Sandusky Tool Company, Sandusky, Ohio, manufacturers of Planes, Plane Irons, Gauges, Handles, Bench and Hand Screws, Cooper and Cabinet Makers' Tools, &c., and Woolworth & Cowles Company, Columbus, Ky. The latter company are large manufacturers of plain wood and metal bound Saddle Stirrups, which are still sold quite extensively in foreign markets and to some extent still in portions of the United States.

PRESIDENT FORNES of the New York Board of Aldermen has appointed as one of a committee of ten to co-operate with the Mayor's committee in arranging the details of the reception to Prince Henry by the city Webster R. Walkley, a member of the Aldermanic Board, chairman of the Committee of Public Education, and one of the governors of the Hardware Club. Mr. Walkley is a director of the Peck, Stow & Wilcox Company and manager of the New York house of that concern.

The Swedish Sure Grip Climber.

The Smith & Hemenway Company, 296 Broadway, New York, are putting on the market the climber herewith shown. The spur, in addition to being welded to



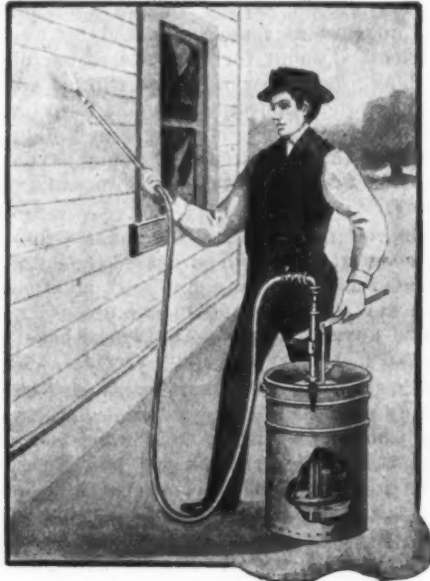
The Swedish Sure Grip Climber.

the upright, is also riveted to make a solid connection. We are informed that in a number of tests recently made it has been demonstrated that it is impossible to knock the spur out. The makers state that each climber is warranted, and that if the spur loosens or comes out they will either refund the money to the purchaser or replace the climber with a new pair. A catalogue will be sent free upon application to the manufacturers.

Rummel & Wright, Iowa Falls, Ia., have disposed of their Hardware, Stove, Agricultural Implement and Sporting Goods business.

Ripley's Whitewash and Painting Machine.

The Ripley Hardware Company, Grafton, Ill., are offering the trade the whitewash and painting machine shown in the accompanying illustration. It has an agitator to keep the solution mixed that works at each stroke of the pump. The top of the can is removable, so that it can be easily cleaned. The body is made of No.



Ripley's Whitewash and Painting Machine.

24 galvanized steel, and is fitted with a ball valve brass cylinder pump, which, it is explained, will produce a high pressure. It is pointed out that it is not a compressed air machine. When not in use as a whitewashing machine it can be used, it is stated, for spraying trees, gardens, washing windows, buggies, &c.

Eagle Spring Rules.

Cornelius Kahlen, 536-538 Pearl street, New York, is the representative for the United States and Canada for

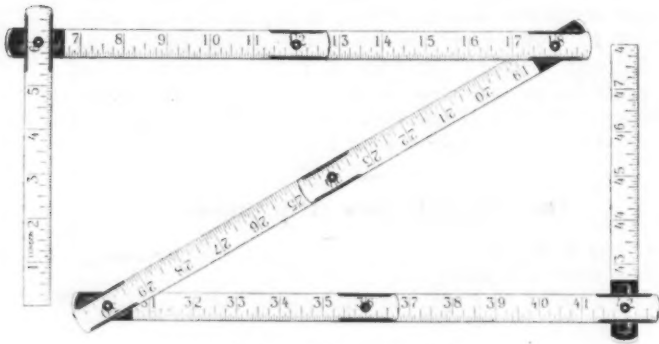


Fig. 1.—Eagle Spring Rule.

the German made Eagle spring rules here shown. The latest feature of this wood rule with spring steel joints is the shape of the brass ends, by means of which it is possible to show all the graduation on both sides, as

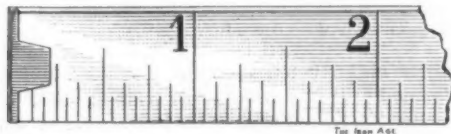


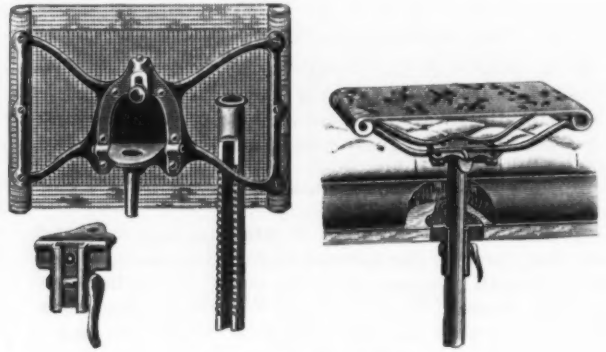
Fig. 2.—End of Rule.

brought out more clearly in Fig. 2, which is actual size. The price of these goods is now moderate enough to be within the reach of all. Where so desired importation orders will be taken in lots of five gross or more for the rules with the dealer's name on at no increase in price. They can also be furnished with or without brass tips.

They are made to record inches by sixteenths on both sides in 2, 3, 4, 5, 6 and 8 foot lengths, and 4-foot lengths with sixteenths of 1 inch on one side and metric measure on the other.

The Champion Third Seat

Illustrated herewith is a third seat, offered the trade by the Racine Pole & Spring Company, Racine, Wis. The seat is referred to as light in appearance, durable, strong and easily raised or lowered. It is detached from

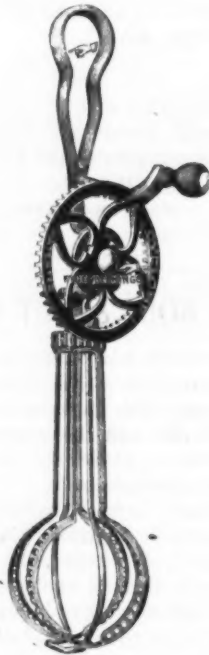


The Champion Third Seat.

the seat by raising the lever at the side of the lock. When the seat is folded back it increases the space in front and allows it to be easily placed under the seat of the carriage. The seat is made with either carpet or wood top.

The Cyclone Egg Beater.

William G. Browne, Kingston, N. Y., is offering the trade the egg beater shown herewith. The perforations in the wings are referred to as the most prom-



The Cyclone Egg Beater.

inent feature of the beater, as it is explained that by them the egg is caught, held and thrown from one flange to the other, and in passing through the perforations is quickly and thoroughly beaten. Among other points of excellence the following are mentioned: That the handle fits the hand; that the bearings are long and the holes are all drilled; that both the blades and the shanks are flanged, making them rigid; that the crank handle is of good size and that the foot at the bottom helps to steady the beater when in use. The manufacturer states that it is an excellent cream whip, and is strong enough to beat cake.

Current Hardware Prices.

REVISED JANUARY 28, 1902.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33½@33½&10% signifies that the price of the goods in question ranges from 33½ per cent. discount to 33½ and 10 per cent. discount.

Cut Prices.—In the present condition of the market there is a good deal of cutting of prices by the jobbing trade, whose quotations are often lower than those of the manufacturers.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE INDEX SUPPLEMENT (April 4, 1901), which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters Blind—

Domestic, # doz. \$3.00, 33½@33½&10%
North's 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent 25&51
Taplin's Perfection 30%

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—American—

Arman Hammer, Wrought #B.5. 40&45
Eagle Anvil, Wrought #B.75. 40&45
Horseshoe brand, Wrought 40

Imported—

Peter Wright's 0.00&0.05

Anvil, Vise and Drill—

Millers Falls Co., #18.00 20%

Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths—

Hull Bros. Co.:
Lots of 1 doz. 25%
Smaller Lots 20%
Lots of 3 doz. 30%

Augers and Bits—

Com. Double Spur 70@70&10%

Boring Machine Augers 60&100@70&10%

Cur Bits, 12-in. twist 60@60&10%

Jennings' Pattern 50&100@60&10%

Auger Bits 50&100@60&10%

Ford's Auger and Car Bits 40&100%

Forster Pat. Auger Bits 25%

C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list 40%

No. 30, R. Jennings' list 50%

Russell Jennings 25&10&25%

L'Hommiedieu Car Bits 15&10&15&10&5%

Mayhew's Countersink Bits 35%

Pugh's Black 30%

Pugh's ending's Pattern 35%

Snell's Auger Bits 60%

Snell's Bell Hangers' Bits 60&10%

Snell's Car Bits, 12-in. twist 60%

Wright's Jennings Bits (R. Jennings' list) 50%

Bit Stock Drills—

Standard List 65@65&5%

Expansive Bits—

Clark's small, #18; large, #26 50&10%

Lavigne's Clark's Pattern, No. 1, # 45&10%

doz. #26; No. 2, #18 50&10%

C. E. Jennings & Co., Steer's Pat. 35&5%

Swan's 60%

Gimlet Bits—

Common Double Cut, gro. #2.25@2.75

German Pattern gro. #3.50@4.50

Hollow Augers—

Bones Pattern, per doz. \$11.00@11.50

Ames 45&10%

New Patent 45&10%

Universal 20%

Wood's Universal 25%

Ship Augers and Bits—

Ford's 40%

Snell's 40%

C. E. Jennings & Co.:
L'Hommiedieu's 15&10%

Watrous' 40%

Awl Hafts, See Hafts, Awl.

Awls—

Handled gro. #7.75@8.10

Unhandle, Shouldered, gro. #3@3.60

Unhandle, Patent, gro. #6@7.00

Peg Awls:
Unhandle, Patent, gro. #1@1.40

Unhandle, Shouldered, gro. #5@7.00

Scratch Awls:
Handled, Common, gro. #3.50@4.00

Handled, Socket, gro. #11.50@13.00

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—
First Quality, best brands, \$5.50@5.75

First Quality, other brands, \$5.50@5.50

Jobbers' Special Brands:
Good Quality 4.50@4.75

Best Quality \$5.00@5.25

Cheap, Handle, Area \$3.50@5.75

Handled and Smooth 4.00@4.25

Extra Heavy, Short Lap 70&100@60%

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Extra Heavy, Short Lap

Cartridges—

Blank Cartridges:
30 C. F., \$5.50 10c @ 10c @ 10c
38 C. F., \$7.00 10c @ 10c @ 10c
22 cal. Rim., \$1.50 10c @ 10c @ 10c
22 cal. Rim., \$1.50 10c @ 10c @ 10c
B. B. Caps. Con. Ball Sngl., \$1.80 @ 1.85
B. B. Caps. Round Ball, \$1.10 @ 1.15
Central Fire 10c @ 10c @ 10c
Pistol and Rifle 10c @ 10c @ 10c
Primed Sells and Bullets 10c @ 10c @ 10c
Rim Fire Sporting 10c @ 10c @ 10c
Rim Fire, Military 10c @ 10c @ 10c

Casters—

Bed 70c @ 10c @ 10c @ 10c
Plate 75c @ 10c @ 10c @ 10c
Philadelphia 75c @ 10c @ 10c @ 10c
Boss 70c @ 10c @ 10c @ 10c
Boss Anti-Friction 70c @ 10c @ 10c @ 10c
Marlin's Patent (Phonix) 45c
Payson's Anti-Friction 70c @ 10c @ 10c @ 10c
Standard Wall Bearing 45c
Tucker's Patent, low list 30c

Cattle Leaders—

See Leaders, Cattle.

Chain, Coil—

American Coil, Cask lots:
3-16 1/4 5-16 3/4 7-16 1/2 9-16
8.00 6.00 5.00 4.25 4.00 4.00 4.00
1/4 3/4 to 1 in. 1/4 to 1 1/4 inch.
3.85 3.85 3.75 per 100 lb.
Less than Cask lots add 25c.
German Coil 80c @ 10c @ 10c @ 10c

Halters and Ties—

Halter Chains 60c @ 10c @ 10c @ 10c
German Halter Chain, list July 24, '97 60c @ 10c @ 10c @ 10c
Cow Ties 60c

Trace, Wagon, &c.—

Traces, Western Standard: 100 pair
6 1/2-6-3, Straight, with ring \$30.00
6 1/2-6-2, Straight, with ring \$21.00
6 1/2-8-2, Straight, with ring \$35.00
6 1/2-10-2, Straight, with ring \$38.00
Add 2c per pair for Hooks.
Twist Traces 2c per pair higher than
Straight Link.
Trace, Wagon and Fancy Chains 60c @ 10c @ 10c @ 10c

Miscellaneous—

Jack Chain, list July 10, '93:
Iron 60c @ 10c @ 10c @ 10c
Brass 60c @ 10c @ 10c @ 10c
Safety Chain 70c @ 10c @ 10c @ 10c
Gal. Pump Chain 4 1/4 @ 1/2 c
Covert Mfg. Co.:
Breast 35c @ 25c
Halter 35c @ 25c
Heel 35c @ 25c
Rein 35c @ 25c
Stallion 35c @ 25c
Covert Saddle Works:
Breast 70c
Halter 70c
Old Back 70c
Rein 70c
Onida Company:
Am. Coll and Halters 40c @ 15c @ 5c
Am. Cow Ties 45c @ 50c @ 5c
Eureka Coll and Halters 45c @ 50c @ 5c
Niagara Coll and Halters 45c @ 50c @ 5c
Niagara Cow Ties 45c @ 50c @ 5c
Wire Dog Chains 45c @ 50c @ 5c
Wire Goods Co.:
Dog Chain 60c @ 10c @ 10c @ 10c
Universal Dog-Jointed Chain 50c

Chalk—(From Jobbers.)

Carpenters' Blue gro. 12 @ 45c
Carpenters' Red gro. 37 @ 40c
Carpenters' White gro. 33 @ 35c
See also Crayons.

Chalk Lines—See Lines.

Checks, Door—

Bardale's 40c @ 10c
Columbia 50c @ 10c
Eclipse 60c @ 10c @ 10c @ 10c

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools 55c
Youths' Chests, with Tools 40c
Gentlemen's Chests, with Tools 30c
Farmers', Carpenters', etc., Chests, with Tools 30c
Machinists' and Pipe Fitters' Chests, Empty 30c
C. E. Jennings & Co.'s Machinists' Tool Chests 20c

Chisels—

Socket Framing and Firmer Standard List 70c @ 70c @ 10c
Buck Bros. 30c
Charles Buck 30c
C. E. Jennings & Co. Socket Firmer No. 10 60c @ 10c
C. E. Jennings & Co. Socket Framing No. 15 60c @ 10c
Swan's 70c @ 5c
L. & J. White 90c @ 90c @ 5c

Tanged—

Tanged Firmers 40c @ 10c @ 10c @ 10c
Buck Bros. 30c
Charles Buck 30c
C. E. Jennings & Co. Nos. 101, 181 35c
L. & J. White, Tanged 95c @ 5c

Cold—

Cold Chisels, good quality, lb. 15 @ 15c
Cold Chisels, fair quality, lb. 11 @ 12c
Cold Chisels, ordinary, lb. 8 @ 9c

Chucks—

Beach Pat. Sngl. \$8.00 20c
Massey's Planer and Milling 15c @ 30c
Skinner Patent Chucks:
Combination Lathe Chucks 40c
Drill Chucks, Patent and Standard 30c
Independent Lathe Chucks 40c
Improved Planer Chucks 25c
Universal Lathe Chucks 40c
Face Plate Jaws 40c
Standard Tool Co.:
Improved Drill Chuck 45c
Union Mfg. Co.:
Combination 40c
Gear Drill 30c
Geared Scroll 30c
Independent 40c
Union Drill 30c
Universal 40c
Face Plate Jaws 55c

Clamps—

Adjustable, Hammers 20c @ 20c @ 5c
Cabinet, Sargent's 50c @ 10c
Carriage Makers', P. S. & W. Co. 40c @ 10c
Carriage Makers' Sargent's 50c @ 10c
Bony, Parallel 30c @ 10c
Lineman's, Ulica Drop Forge & Tool Co. 40c
Saw Clamps, see Vises, Saw Miter's.

Cleaners, Sidewalk—

Star Socket, All Steel \$4.00 net
Star Shank, All Steel \$3.75 net
W. & C. Shank, All Steel, 7 1/2 in. 4 in., \$10.00; 8 in., \$10.10; 8 1/2 in., \$12.25.

Cleavers, Butchers—

Foster Bros. 30c
New Haven Edge Tool Co.'s 40c
Fayette R. Plumb 33 1/2 @ 33 1/2 @ 10c
P. S. & W. 50c @ 50c @ 5c
L. & J. White 25c

Clippers—

Chicago Flexible Shaft Company
Handy Toilet \$ dos. \$7.50
Mascoite Toilet \$ dos. \$8.40
Monitor Toilet \$ dos. \$9.00
Stewart's Patent \$ dos. \$10.00

Clips, Axle—

Eagle and Superior 4 and 5-16 inch 70c @ 10c
Norway, 1/4 and 5-16 inch 70c @ 10c

Cloth and Netting, Wire—

See Wire, etc.

Cocks, Brass—

Hardware list:
Compression and Plain Bibbs 65c @ 65c @ 10c
Globe, Kerosene, Racking, etc. 65c @ 10c @ 70c
Cocks 65c @ 10c @ 70c

Coffee Mills—See Mills, Coffee.

Collars, Dog—

Brass, Pope & Stevens' list 40c
Embossed, Gilt, Pope & Stevens' list 30c @ 10c
Leather, Pope & Stevens' list 40c

Compasses, Dividers, &c.—

Ordinary Goods 75c @ 75c @ 5c
Bemis & Cail Hdw. & Tool Co.:
Dividers 65c
Callipers, Call's Patent Inside 50c
Callipers, Double 65c
Callipers, Inside or Outside 65c
Callipers, Wing 60c
Compasses 50c
J. Stevens & T. Co. 25c @ 10c

Compressors, Corn Shock—

J. B. Hughes' \$ dos. \$2.50

Conductor Pipe, Galva.—

L. C. L. to Dealers: Noted.

Territory 70c @ 10c @ 10c @ 10c
Eastern 70c @ 10c @ 10c @ 10c
Central 70c @ 10c @ 10c @ 10c
Southern 65c @ 10c @ 10c @ 10c
S. Western 60c @ 10c @ 10c @ 10c
Terms, 25 for cash.
Jobbers receive extra 1 1/4 c @ 10c on car loads loose, and extra 1 1/4 c on car loads crated.
See also Eave Troughs.

Coolers, Water—

Nos. 1 2 3 4 6
Laborator \$11.50 \$14.00 \$17.50 \$20.00
\$21.00
Nos. 3 4 6 8
Ice land \$23.00 \$25.00 \$30.00 \$37.50
14 gal.
\$57.00 \$72.00

Coopers' Tools—

See Tools, Coopers.

Cord—Sash—

Braided, Drab lb. 25c
Braided, White, Common lb. 17c @ 18c
Cable Laid Italian lb. 17c @ 18c
Common India lb. 9c @ 9 1/2 c
Cotton Sash Cord, Twisted lb. 12c @ 13c
Patent Russia lb. 12 1/2 @ 13c
Cable Laid Russia lb. 18 1/2 @ 19c
India Hemp, Braided lb. 14c @ 15c
India Hemp, Twisted lb. 10c @ 12c
Patent India, Twisted lb. 10c @ 12c
Pearl Braided, cotton lb. 17 1/2 c
Massachusetts, White lb. 20c @ 21c
Massachusetts, D. ab. lb. 20c @ 21c
Eddystone Braided Cotton lb. 19c
Harmony Cable Laid Italian lb. 18c
Osway Mills
Crown, Solid Braided White lb. 20c @ 21c
Braided, Giant, White lb. 20c @ 21c
Peerless:
Cable Laid Italian 16c
Cable Laid Russian 14c
Cable Laid India 12c
Braided India 12c
Phonix, White 19c
Ramsen, Nos. 7 to 12:
Braided, Drab Cotton lb. 32c @ 34c
Braided, Italian Hemp lb. 32c @ 34c
Braided, Linon lb. 40c @ 42c
Braided, White Cotton, Spot lb. 38c @ 40c
No. 6 cords, 1 1/2 extra.
Silver Lake:
A quality, Drab, 40c 15c
A quality, White, 35c 15c
B quality, Drab, 35c 15c
B quality, White, 30c 15c
Italian Hemp, 40c 15c
Linen, 57c 15c

Wire, Picture—

Braided or Twisted 85c @ 10c @ 5c
Note.—There is a good deal of confusion in lists, some using old list and others the new list.

Corn Knives and Cutters—

See Knives, Corn.

Corn Planters—

See Planters, Corn.

Crackers, Nut—

Little Giant, \$ gr. \$24.00

Cradles—

Grain 50c

Crayons—

H. & A. Round Crayons, gross, 5 1/2 @ 50c
Cases, 100 gro., \$4.50, at factory.
D. M. Stewart Mfg. Co.
Metal Workers' Crayons, gr. \$2.50
Soapstone Pencils, round, flat or square gr. \$1.50
Rolling Mill Crayons gr. \$2.50
Railroad Crayons (composition) gr. \$2.00
See also Chalk.
Creamery Pails—See Pails, Creamery.
Crooks, Shepherd's—
Fort Madison, Heavy \$ dos. \$7.00

Fort Madison, Light \$ dos. \$6.50

Crow Bars—See Bars, Crow.

Cultivators—

Victor Garden \$ dos. \$10.00

Cutlery, Table—

International Silver Company:
No. 12 Medium Knives, 1847 \$ dos. \$3.50
Star, Eagle, Rogers & Hamilton and Anchor \$ dos. \$3.00
Wm. Rogers & Son \$ dos. \$2.50
Simson L. & Geo. H. Rogers Company:
12 dwt. Medium Knives \$ dos. \$3.00
No. 77 Medium Knives \$ dos. \$2.50

Cutters—Glass—

H. H. Mayhew Co. 40c
Smith & Hemenway Co. 50c

Meat—

Hale's, Nos. 11 & 11 1/2 & 11 3/4 & 11 1/2
Per doz. \$9.50 12.50 16.00
American 30c
Nos. 1 2 3 4 5
\$5 \$7 \$10 \$25 \$50 \$100
Connecticut 60c
Nos. 20 40 60 8 10 12
Each \$1.75 2.00 2.25 3.00 3.00 4.00
Enterprise 25c @ 25c @ 7 1/2 c
Nos. 5 10 15 22 32
Each \$2 \$3 \$3.50 \$4 \$5
Dixon's, \$ dos. 3c @ 10c @ 40c
Nos. 1
\$14.00 \$17.00 \$10.00 \$30.00
Home No. 1, \$ dos. \$23.75 50c @ 10c
Little Giant, \$ dos. 33 1/2 @ 35c @ 40c
Nos. 305 310 312 340 325
\$25.00 \$45.00 \$44.00 \$75.00 \$68.00
Sterling 33 1/2 @ 35c
Nos. 1 2 3
Each \$5.00 \$3.50
New Triumph No. 605, \$ dos. \$24.00 30c @ 10c @ 40c
Woodruff's, \$ dos. 30c @ 10c @ 40c
Nos. 1 2 3
Each \$15.00 \$18.00
Chadborn's Smoked Beef Cutter, \$ dos. \$60.00
Enterprise Beef Shavers 25c @ 30c

Slaw and Kraut—

Henry Disston & Sons:
Slaw, Corn Grater, etc. 40c
Kraut Cutter \$34 x 7. 30 x 8. 30 x 9. 55c
Kraut Cutters 16 x 12, 40 x 12 40c
Tucker & Dorsey Mfg. Co.:
Kraut Cutters 40c
Slaw Cutters, 1 Knife, \$ gr. \$19.00 @ 20
Slaw Cutters, 2 Knife, \$ gr. \$39.00 @ 40

Tobacco—

All Iron, Cheap \$ dos. \$1.25 @ \$1.50
Enterprise 35c @ 50c
National, \$ dos. \$21.00 40c
Sargent's, \$ dos. No. 2 45c @ 10c
Sargent's No. 12 and 21 90c @ 10c

Washer—

Appleton's, \$ dos. \$16.00 50c @ 10c @ 10c
Bonney's 40c

Diggers, Post Hole, &c.—

Dalbey Post Hole Auger, per doz. \$9.00
Iwan's Improved Post Hole Auger 40c
Iwan's Perfection Post Hole Digger 40c

Kohler's Universal—

Kohler's Universal \$ dos. \$9.00
Kohler's Little Giant \$ dos. \$14.00
Kohler's Hercules \$ dos. \$12.00
Kohler's Invincible \$ dos. \$10.00
Kohler's Rival \$ dos. \$9.00
Kohler's Pioneer \$ dos. \$9.00
Never-Break Post Hole Diggers, \$ dos. \$24.00
Samson, \$ dos. \$34.00 30c

Dividers—See Compasses.

Dog Collars—See Collars, Dog.

Door Checks—

See Checks, Door.

Door Springs—

See Springs, Door.

Doors, Screen—

Porter's Plain, No. 6 \$ dos. \$6.30
Porter's Ornamental, No. 70, \$ dos. \$10.00

Drawers, Money—

Tucker's Pat. Alarm Till No. 1, \$ dos. \$18; No. 2, \$15; No. 3, \$12; No. 4, \$18.

Drawing Knives—

See Knives, Drawing.

Drills and Drill Stocks—

Common Blacksmiths' Drill, each \$1.50 @ \$1.75
Blacksmiths' Self-feeding, each \$3.75 @ 4.00
Breast, Millers Falls, each \$3.00 15c @ 10c
Breast, P. S. & W. 40c @ 10c @ 5c
Goodell Automatic Drills, 40c @ 10c @ 10c
John's Automatic Drills Nos. 3 and 3 1/2 10c @ 5c
Johnson's Drill Points 25c @ 10c
Ratchet, Curtis & Curtis 25c
Ratchet, Parker's 40c
Ratchet, Weston's 20c @ 25c
Ratchet, Whitney's, P. S. & W. 50c
Whitney's Hand Drill, No. 1, \$10.00
Adjustable, No. 10, \$12.00 33 1/2 c

Twist Drills—

Standard List 60c @ 60c @ 10c @ 10c

Drill Bits or Bit Stock

Drills—See Augers and Bits.

Drill Chucks—See Chucks.

Dripping Pans—

See Pans, Dripping.

Drivers, Screw—

Screen Driver Bits per doz. 45 @ 70c
Balsey's Screw Holder and Driver, \$ dos. 9c @ 10c; 4-in., \$7.50 6-in., \$9.40c
Buck Bros. 30c
Buck Bros' Screw Driver Bits 30c
Champion 40c @ 10c
Douglas Mfg. Co. 30c @ 50c @ 10c
Fray's Hol. die Sets, No. 3, \$15.00 30c
Gay's Double Action Ratchet 35c
Goodell's Automatic 50c @ 10c @ 10c @ 10c @ 5c
Mayhew's Black Handle 50c
Mayhew's Monarch 40c @ 10c
New England Specialty Co. 50c @ 10c
Sargent & Co.'s:
Nos. 1, 50, 35 and 60 50c @ 10c @ 10c
Nos. 20 and 40 50c @ 10c
Smith & Hemenway Co. 40c @ 5c
Stanley's R. & L. Co.'s:
No. 64, Varnished Handles, 70c @ 70c @ 10c @ 10c
Swan's:
Nos. 95 to 65 50c
No. 40 40c @ 10c
Nos. 35, 35 and 45 60c @ 10c @ 10c

Eave Trough Galvanized

Territory. L. C. L.
Eastern 75c @ 10c @ 10c @ 10c
Central 75c @ 10c @ 10c @ 10c
Southern 70c @ 10c @ 10c @ 10c
S. Western 70c @ 10c @ 10c @ 10c
Terms, 25 for cash.
See also Conductor Pipe and Elbows.

Egg Beaters—See Beaters, Egg

Egg Openers—

See Openers, Egg.

Elbows and Shoes—

Factory shipments 60c
Perfect Elbows (S. S. & Co.) 40c

Emery, Turkish—

40c @ 5c @ 10c @ 10c @ 10c
Kegs lb. 5c 5 1/2 c 5c 5c
1/2 Kegs lb. 5c 5 1/2 c 5c 5c
10-lb cans, 10 in case 5 1/2 c 7c 6c
10-lb cans, less than 10.10c 10c 8c
Note.—In lots of 1 to 3 tons a discount of 10% is given.

Enameled and Tinned Ware—See Ware, Hollow.

Escutcheon Pins—

See Pins, Escutcheon.

Extractors, Lemon Juice—

See Squeezers, Lemon.

Fasteners, Blind—

Zimmerman's 50c @ 10c

Faucets—

Cork Lined 70c @ 10c @ 10c @ 10c
Metallic Key, Leather Lined 70c @ 10c @ 10c @ 10c

Red Cedar 60c @ 50c @ 10c

R. & L. H. Co.:
Lockport, Metal Plug, reduced list 60c @ 5c
Star 40c @ 10c @ 5c
Star, Metal Plug, new list 40c @ 10c @ 5c
West's Lock, Open and Shut Key 50c @ 10c
John Sommer's Peerless Tin Key 40c
John Sommer's Boss Tin Key 50c
John Sommer's Victor Metal Key 50c @ 10c
John Sommer's Duplex Metal Key 60c
John Sommer's Diamond Lock 40c
John Sommer's I. X. L. Cork Lined 50c
John Sommer's Reliable Cork Lined 50c @ 10c
John Sommer's Chicago Cork Lined 60c
John Sommer's O. K. Cork Lined 50c
John Sommer's No Brand, Cedar 40c
John Sommer's Perfection Cedar 40c
McKenna, Brass:
Burglar Proof, N. P. 35c
Improved, 1/4 and 1/2 inch 35c
Self Measuring:
Enterprise, \$ dos. \$30.00 40c @ 10c
Lane's, \$ dos. \$36.00 40c @ 10c
National Measuring, \$ dos. \$36.00 40c

Felloe Plates—

See Plates, Felloe.

Files Domestic—

List revised Nov. 1, 1899.

Best Brands 70c @ 75c @ 5c

Good Brands 75c @ 10c @ 10c @ 10c

Fair Brands 30c @ 30c @ 10c

Second Quality 30c @ 10c @ 30c @ 5c

Imported—

Stubs' Tapers, Stubs' list, July 24, '97 25c

Fixtures, Grindstone—

Inch 15 17 19 21 24
Per doz. \$2.60 2.75 3.00 3.50 4.40
P. S. & W. Co. 50c @ 50c @ 5c
Reading Hardware Co. 60c
Sargent's 60c @ 10c @ 10c
Stowell's Giant Grindstone Hanger \$ dos. \$6.00
Stowell's Grindstone Fixtures, Extra Heavy 50c @ 10c @ 10c
Stowell's Grindstone Fixtures Light 60c @ 10c

Gates, Molasses and Oil-
Gauges—

Marking, Mortise, etc.
Parrett's Comb. Roller Gauge.
Stanley R. & L. Co.'s Butt & Babbet
Gauge.
Wire, Brown & Sharpe's.
Wire, Morse's.
Wire P. S. & W. Co.

Glue—Single Cut—
Nail, Metal, Assorted, gro. \$1.50 @ 1.80
Spike, Metal, Assorted, gro. \$3.50 @ 3.75
Nail, Wood Handled, Assorted.

Spike, Wood Handled, Assorted.
gro. \$1.75 @ 3.00

Glass, American Window
Jobbers' List, Jan. 21, 1901.
Less than Car Lots from Store.
Car Lots from Store.
Car Lot Consignments, f.o.b. factory.

Glue—Liquid, Fish—
List A, Bottles or Cans, with Brush.
List B, Cans (1/4 pts., pts., qts.).
List C, Cans (1/2 gal., gal., gal.).
International Glue Co. (Marl).

Glue Pots—See Pots, Glue.
Grease, Axle—
Common Grade, gro. \$5.00 @ 6.00
Dixon's Everlasting, 10 lb. pails, ea. \$5.50
Dixon's Everlasting, 1 lb. doz. 1 lb.
Snow Flake.

1 qt. cans, per doz. \$2.00; 2 qt., \$3.20; 3 qt., \$4.40; 4 qt., \$5.60; 5 qt., \$6.80; 6 qt., \$8.00; 7 qt., \$9.20; 8 qt., \$10.40; 9 qt., \$11.60; 10 qt., \$12.80; 11 qt., \$14.00; 12 qt., \$15.20; 13 qt., \$16.40; 14 qt., \$17.60; 15 qt., \$18.80; 16 qt., \$20.00; 17 qt., \$21.20; 18 qt., \$22.40; 19 qt., \$23.60; 20 qt., \$24.80; 21 qt., \$26.00; 22 qt., \$27.20; 23 qt., \$28.40; 24 qt., \$29.60; 25 qt., \$30.80; 26 qt., \$32.00; 27 qt., \$33.20; 28 qt., \$34.40; 29 qt., \$35.60; 30 qt., \$36.80; 31 qt., \$38.00; 32 qt., \$39.20; 33 qt., \$40.40; 34 qt., \$41.60; 35 qt., \$42.80; 36 qt., \$44.00; 37 qt., \$45.20; 38 qt., \$46.40; 39 qt., \$47.60; 40 qt., \$48.80; 41 qt., \$50.00; 42 qt., \$51.20; 43 qt., \$52.40; 44 qt., \$53.60; 45 qt., \$54.80; 46 qt., \$56.00; 47 qt., \$57.20; 48 qt., \$58.40; 49 qt., \$59.60; 50 qt., \$60.80; 51 qt., \$62.00; 52 qt., \$63.20; 53 qt., \$64.40; 54 qt., \$65.60; 55 qt., \$66.80; 56 qt., \$68.00; 57 qt., \$69.20; 58 qt., \$70.40; 59 qt., \$71.60; 60 qt., \$72.80; 61 qt., \$74.00; 62 qt., \$75.20; 63 qt., \$76.40; 64 qt., \$77.60; 65 qt., \$78.80; 66 qt., \$80.00; 67 qt., \$81.20; 68 qt., \$82.40; 69 qt., \$83.60; 70 qt., \$84.80; 71 qt., \$86.00; 72 qt., \$87.20; 73 qt., \$88.40; 74 qt., \$89.60; 75 qt., \$90.80; 76 qt., \$92.00; 77 qt., \$93.20; 78 qt., \$94.40; 79 qt., \$95.60; 80 qt., \$96.80; 81 qt., \$98.00; 82 qt., \$99.20; 83 qt., \$100.40; 84 qt., \$101.60; 85 qt., \$102.80; 86 qt., \$104.00; 87 qt., \$105.20; 88 qt., \$106.40; 89 qt., \$107.60; 90 qt., \$108.80; 91 qt., \$110.00; 92 qt., \$111.20; 93 qt., \$112.40; 94 qt., \$113.60; 95 qt., \$114.80; 96 qt., \$116.00; 97 qt., \$117.20; 98 qt., \$118.40; 99 qt., \$119.60; 100 qt., \$120.80; 101 qt., \$122.00; 102 qt., \$123.20; 103 qt., \$124.40; 104 qt., \$125.60; 105 qt., \$126.80; 106 qt., \$128.00; 107 qt., \$129.20; 108 qt., \$130.40; 109 qt., \$131.60; 110 qt., \$132.80; 111 qt., \$134.00; 112 qt., \$135.20; 113 qt., \$136.40; 114 qt., \$137.60; 115 qt., \$138.80; 116 qt., \$140.00; 117 qt., \$141.20; 118 qt., \$142.40; 119 qt., \$143.60; 120 qt., \$144.80; 121 qt., \$146.00; 122 qt., \$147.20; 123 qt., \$148.40; 124 qt., \$149.60; 125 qt., \$150.80; 126 qt., \$152.00; 127 qt., \$153.20; 128 qt., \$154.40; 129 qt., \$155.60; 130 qt., \$156.80; 131 qt., \$158.00; 132 qt., \$159.20; 133 qt., \$160.40; 134 qt., \$161.60; 135 qt., \$162.80; 136 qt., \$164.00; 137 qt., \$165.20; 138 qt., \$166.40; 139 qt., \$167.60; 140 qt., \$168.80; 141 qt., \$170.00; 142 qt., \$171.20; 143 qt., \$172.40; 144 qt., \$173.60; 145 qt., \$174.80; 146 qt., \$176.00; 147 qt., \$177.20; 148 qt., \$178.40; 149 qt., \$179.60; 150 qt., \$180.80; 151 qt., \$182.00; 152 qt., \$183.20; 153 qt., \$184.40; 154 qt., \$185.60; 155 qt., \$186.80; 156 qt., \$188.00; 157 qt., \$189.20; 158 qt., \$190.40; 159 qt., \$191.60; 160 qt., \$192.80; 161 qt., \$194.00; 162 qt., \$195.20; 163 qt., \$196.40; 164 qt., \$197.60; 165 qt., \$198.80; 166 qt., \$200.00; 167 qt., \$201.20; 168 qt., \$202.40; 169 qt., \$203.60; 170 qt., \$204.80; 171 qt., \$206.00; 172 qt., \$207.20; 173 qt., \$208.40; 174 qt., \$209.60; 175 qt., \$210.80; 176 qt., \$212.00; 177 qt., \$213.20; 178 qt., \$214.40; 179 qt., \$215.60; 180 qt., \$216.80; 181 qt., \$218.00; 182 qt., \$219.20; 183 qt., \$220.40; 184 qt., \$221.60; 185 qt., \$222.80; 186 qt., \$224.00; 187 qt., \$225.20; 188 qt., \$226.40; 189 qt., \$227.60; 190 qt., \$228.80; 191 qt., \$230.00; 192 qt., \$231.20; 193 qt., \$232.40; 194 qt., \$233.60; 195 qt., \$234.80; 196 qt., \$236.00; 197 qt., \$237.20; 198 qt., \$238.40; 199 qt., \$239.60; 200 qt., \$240.80; 201 qt., \$242.00; 202 qt., \$243.20; 203 qt., \$244.40; 204 qt., \$245.60; 205 qt., \$246.80; 206 qt., \$248.00; 207 qt., \$249.20; 208 qt., \$250.40; 209 qt., \$251.60; 210 qt., \$252.80; 211 qt., \$254.00; 212 qt., \$255.20; 213 qt., \$256.40; 214 qt., \$257.60; 215 qt., \$258.80; 216 qt., \$260.00; 217 qt., \$261.20; 218 qt., \$262.40; 219 qt., \$263.60; 220 qt., \$264.80; 221 qt., \$266.00; 222 qt., \$267.20; 223 qt., \$268.40; 224 qt., \$269.60; 225 qt., \$270.80; 226 qt., \$272.00; 227 qt., \$273.20; 228 qt., \$274.40; 229 qt., \$275.60; 230 qt., \$276.80; 231 qt., \$278.00; 232 qt., \$279.20; 233 qt., \$280.40; 234 qt., \$281.60; 235 qt., \$282.80; 236 qt., \$284.00; 237 qt., \$285.20; 238 qt., \$286.40; 239 qt., \$287.60; 240 qt., \$288.80; 241 qt., \$290.00; 242 qt., \$291.20; 243 qt., \$292.40; 244 qt., \$293.60; 245 qt., \$294.80; 246 qt., \$296.00; 247 qt., \$297.20; 248 qt., \$298.40; 249 qt., \$299.60; 250 qt., \$300.80; 251 qt., \$302.00; 252 qt., \$303.20; 253 qt., \$304.40; 254 qt., \$305.60; 255 qt., \$306.80; 256 qt., \$308.00; 257 qt., \$309.20; 258 qt., \$310.40; 259 qt., \$311.60; 260 qt., \$312.80; 261 qt., \$314.00; 262 qt., \$315.20; 263 qt., \$316.40; 264 qt., \$317.60; 265 qt., \$318.80; 266 qt., \$320.00; 267 qt., \$321.20; 268 qt., \$322.40; 269 qt., \$323.60; 270 qt., \$324.80; 271 qt., \$326.00; 272 qt., \$327.20; 273 qt., \$328.40; 274 qt., \$329.60; 275 qt., \$330.80; 276 qt., \$332.00; 277 qt., \$333.20; 278 qt., \$334.40; 279 qt., \$335.60; 280 qt., \$336.80; 281 qt., \$338.00; 282 qt., \$339.20; 283 qt., \$340.40; 284 qt., \$341.60; 285 qt., \$342.80; 286 qt., \$344.00; 287 qt., \$345.20; 288 qt., \$346.40; 289 qt., \$347.60; 290 qt., \$348.80; 291 qt., \$350.00; 292 qt., \$351.20; 293 qt., \$352.40; 294 qt., \$353.60; 295 qt., \$354.80; 296 qt., \$356.00; 297 qt., \$357.20; 298 qt., \$358.40; 299 qt., \$359.60; 300 qt., \$360.80; 301 qt., \$362.00; 302 qt., \$363.20; 303 qt., \$364.40; 304 qt., \$365.60; 305 qt., \$366.80; 306 qt., \$368.00; 307 qt., \$369.20; 308 qt., \$370.40; 309 qt., \$371.60; 310 qt., \$372.80; 311 qt., \$374.00; 312 qt., \$375.20; 313 qt., \$376.40; 314 qt., \$377.60; 315 qt., \$378.80; 316 qt., \$380.00; 317 qt., \$381.20; 318 qt., \$382.40; 319 qt., \$383.60; 320 qt., \$384.80; 321 qt., \$386.00; 322 qt., \$387.20; 323 qt., \$388.40; 324 qt., \$389.60; 325 qt., \$390.80; 326 qt., \$392.00; 327 qt., \$393.20; 328 qt., \$394.40; 329 qt., \$395.60; 330 qt., \$396.80; 331 qt., \$398.00; 332 qt., \$399.20; 333 qt., \$400.40; 334 qt., \$401.60; 335 qt., \$402.80; 336 qt., \$404.00; 337 qt., \$405.20; 338 qt., \$406.40; 339 qt., \$407.60; 340 qt., \$408.80; 341 qt., \$410.00; 342 qt., \$411.20; 343 qt., \$412.40; 344 qt., \$413.60; 345 qt., \$414.80; 346 qt., \$416.00; 347 qt., \$417.20; 348 qt., \$418.40; 349 qt., \$419.60; 350 qt., \$420.80; 351 qt., \$422.00; 352 qt., \$423.20; 353 qt., \$424.40; 354 qt., \$425.60; 355 qt., \$426.80; 356 qt., \$428.00; 357 qt., \$429.20; 358 qt., \$430.40; 359 qt., \$431.60; 360 qt., \$432.80; 361 qt., \$434.00; 362 qt., \$435.20; 363 qt., \$436.40; 364 qt., \$437.60; 365 qt., \$438.80; 366 qt., \$440.00; 367 qt., \$441.20; 368 qt., \$442.40; 369 qt., \$443.60; 370 qt., \$444.80; 371 qt., \$446.00; 372 qt., \$447.20; 373 qt., \$448.40; 374 qt., \$449.60; 375 qt., \$450.80; 376 qt., \$452.00; 377 qt., \$453.20; 378 qt., \$454.40; 379 qt., \$455.60; 380 qt., \$456.80; 381 qt., \$458.00; 382 qt., \$459.20; 383 qt., \$460.40; 384 qt., \$461.60; 385 qt., \$462.80; 386 qt., \$464.00; 387 qt., \$465.20; 388 qt., \$466.40; 389 qt., \$467.60; 390 qt., \$468.80; 391 qt., \$470.00; 392 qt., \$471.20; 393 qt., \$472.40; 394 qt., \$473.60; 395 qt., \$474.80; 396 qt., \$476.00; 397 qt., \$477.20; 398 qt., \$478.40; 399 qt., \$479.60; 400 qt., \$480.80; 401 qt., \$482.00; 402 qt., \$483.20; 403 qt., \$484.40; 404 qt., \$485.60; 405 qt., \$486.80; 406 qt., \$488.00; 407 qt., \$489.20; 408 qt., \$490.40; 409 qt., \$491.60; 410 qt., \$492.80; 411 qt., \$494.00; 412 qt., \$495.20; 413 qt., \$496.40; 414 qt., \$497.60; 415 qt., \$498.80; 416 qt., \$500.00; 417 qt., \$501.20; 418 qt., \$502.40; 419 qt., \$503.60; 420 qt., \$504.80; 421 qt., \$506.00; 422 qt., \$507.20; 423 qt., \$508.40; 424 qt., \$509.60; 425 qt., \$510.80; 426 qt., \$512.00; 427 qt., \$513.20; 428 qt., \$514.40; 429 qt., \$515.60; 430 qt., \$516.80; 431 qt., \$518.00; 432 qt., \$519.20; 433 qt., \$520.40; 434 qt., \$521.60; 435 qt., \$522.80; 436 qt., \$524.00; 437 qt., \$525.20; 438 qt., \$526.40; 439 qt., \$527.60; 440 qt., \$528.80; 441 qt., \$530.00; 442 qt., \$531.20; 443 qt., \$532.40; 444 qt., \$533.60; 445 qt., \$534.80; 446 qt., \$536.00; 447 qt., \$537.20; 448 qt., \$538.40; 449 qt., \$539.60; 450 qt., \$540.80; 451 qt., \$542.00; 452 qt., \$543.20; 453 qt., \$544.40; 454 qt., \$545.60; 455 qt., \$546.80; 456 qt., \$548.00; 457 qt., \$549.20; 458 qt., \$550.40; 459 qt., \$551.60; 460 qt., \$552.80; 461 qt., \$554.00; 462 qt., \$555.20; 463 qt., \$556.40; 464 qt., \$557.60; 465 qt., \$558.80; 466 qt., \$560.00; 467 qt., \$561.20; 468 qt., \$562.40; 469 qt., \$563.60; 470 qt., \$564.80; 471 qt., \$566.00; 472 qt., \$567.20; 473 qt., \$568.40; 474 qt., \$569.60; 475 qt., \$570.80; 476 qt., \$572.00; 477 qt., \$573.20; 478 qt., \$574.40; 479 qt., \$575.60; 480 qt., \$576.80; 481 qt., \$578.00; 482 qt., \$579.20; 483 qt., \$580.40; 484 qt., \$581.60; 485 qt., \$582.80; 486 qt., \$584.00; 487 qt., \$585.20; 488 qt., \$586.40; 489 qt., \$587.60; 490 qt., \$588.80; 491 qt., \$590.00; 492 qt., \$591.20; 493 qt., \$592.40; 494 qt., \$593.60; 495 qt., \$594.80; 496 qt., \$596.00; 497 qt., \$597.20; 498 qt., \$598.40; 499 qt., \$599.60; 500 qt., \$600.80; 501 qt., \$602.00; 502 qt., \$603.20; 503 qt., \$604.40; 504 qt., \$605.60; 505 qt., \$606.80; 506 qt., \$608.00; 507 qt., \$609.20; 508 qt., \$610.40; 509 qt., \$611.60; 510 qt., \$612.80; 511 qt., \$614.00; 512 qt., \$615.20; 513 qt., \$616.40; 514 qt., \$617.60; 515 qt., \$618.80; 516 qt., \$620.00; 517 qt., \$621.20; 518 qt., \$622.40; 519 qt., \$623.60; 520 qt., \$624.80; 521 qt., \$626.00; 522 qt., \$627.20; 523 qt., \$628.40; 524 qt., \$629.60; 525 qt., \$630.80; 526 qt., \$632.00; 527 qt., \$633.20; 528 qt., \$634.40; 529 qt., \$635.60; 530 qt., \$636.80; 531 qt., \$638.00; 532 qt., \$639.20; 533 qt., \$640.40; 534 qt., \$641.60; 535 qt., \$642.80; 536 qt., \$644.00; 537 qt., \$645.20; 538 qt., \$646.40; 539 qt., \$647.60; 540 qt., \$648.80; 541 qt., \$650.00; 542 qt., \$651.20; 543 qt., \$652.40; 544 qt., \$653.60; 545 qt., \$654.80; 546 qt., \$656.00; 547 qt., \$657.20; 548 qt., \$658.40; 549 qt., \$659.60; 550 qt., \$660.80; 551 qt., \$662.00; 552 qt., \$663.20; 553 qt., \$664.40; 554 qt., \$665.60; 555 qt., \$666.80; 556 qt., \$668.00; 557 qt., \$669.20; 558 qt., \$670.40; 559 qt., \$671.60; 560 qt., \$672.80; 561 qt., \$674.00; 562 qt., \$675.20; 563 qt., \$676.40; 564 qt., \$677.60; 565 qt., \$678.80; 566 qt., \$680.00; 567 qt., \$681.20; 568 qt., \$682.40; 569 qt., \$683.60; 570 qt., \$684.80; 571 qt., \$686.00; 572 qt., \$687.20; 573 qt., \$688.40; 574 qt., \$689.60; 575 qt., \$690.80; 576 qt., \$692.00; 577 qt., \$693.20; 578 qt., \$694.40; 579 qt., \$695.60; 580 qt., \$696.80; 581 qt., \$698.00; 582 qt., \$699.20; 583 qt., \$700.40; 584 qt., \$701.60; 585 qt., \$702.80; 586 qt., \$704.00; 587 qt., \$705.20; 588 qt., \$706.40; 589 qt., \$707.60; 590 qt., \$708.80; 591 qt., \$710.00; 592 qt., \$711.20; 593 qt., \$712.40; 594 qt., \$713.60; 595 qt., \$714.80; 596 qt., \$716.00; 597 qt., \$717.20; 598 qt., \$718.40; 599 qt., \$719.60; 600 qt., \$720.80; 601 qt., \$722.00; 602 qt., \$723.20; 603 qt., \$724.40; 604 qt., \$725.60; 605 qt., \$726.80; 606 qt., \$728.00; 607 qt., \$729.20; 608 qt., \$730.40; 609 qt., \$731.60; 610 qt., \$732.80; 611 qt., \$734.00; 612 qt., \$735.20; 613 qt., \$736.40; 614 qt., \$737.60; 615 qt., \$738.80; 616 qt., \$740.00; 617 qt., \$741.20; 618 qt., \$742.40; 619 qt., \$743.60; 620 qt., \$744.80; 621 qt., \$746.00; 622 qt., \$747.20; 623 qt., \$748.40; 624 qt., \$749.60; 625 qt., \$750.80; 626 qt., \$752.00; 627 qt., \$753.20; 628 qt., \$754.40; 629 qt., \$755.60; 630 qt., \$756.80; 631 qt., \$758.00; 632 qt., \$759.20; 633 qt., \$760.40; 634 qt., \$761.60; 635 qt., \$762.80; 636 qt., \$764.00; 637 qt., \$765.20; 638 qt., \$766.40; 639 qt., \$767.60; 640 qt., \$768.80; 641 qt., \$770.00; 642 qt., \$771.20; 643 qt., \$772.40; 644 qt., \$773.60; 645 qt., \$774.80; 646 qt., \$776.00; 647 qt., \$777.20; 648 qt., \$778.40; 649 qt., \$779.60; 650 qt., \$780.80; 651 qt., \$782.00; 652 qt., \$783.20; 653 qt., \$784.40; 654 qt., \$785.60; 655 qt., \$786.80; 656 qt., \$788.00; 657 qt., \$789.20; 658 qt., \$790.40; 659 qt., \$791.60; 660 qt., \$792.80; 661 qt., \$794.00; 662 qt., \$795.20; 663 qt., \$796.40; 664 qt., \$797.60; 665 qt., \$798.80; 666 qt., \$800.00; 667 qt., \$801.20; 668 qt., \$802.40; 669 qt., \$803.60; 670 qt., \$804.80; 671 qt., \$806.00; 672 qt., \$807.20; 673 qt., \$808.40; 674 qt., \$809.60; 675 qt., \$810.80; 676 qt., \$812.00; 677 qt., \$813.20; 678 qt., \$814.40; 679 qt., \$815.60; 680 qt., \$816.80; 681 qt., \$818.00; 682 qt., \$819.20; 683 qt., \$820.40; 684 qt., \$821.60; 685 qt., \$822.80; 686 qt., \$824.00; 687 qt., \$825.20; 688 qt., \$826.40; 689 qt., \$827.60; 690 qt., \$828.80; 691 qt., \$830.00; 692 qt., \$831.20; 693 qt., \$832.40; 694 qt., \$833.60; 695 qt., \$834.80; 696 qt., \$836.00; 697 qt., \$837.20; 698 qt., \$838.40; 699 qt., \$839.60; 700 qt., \$840.80; 701 qt., \$842.00; 702 qt., \$843.20; 703 qt., \$844.40; 704 qt., \$845.60; 705 qt., \$846.80; 706 qt., \$848.00; 707 qt., \$849.20; 708 qt., \$850.40; 709 qt., \$851.60; 710 qt., \$852.80; 711 qt., \$854.00; 712 qt., \$855.20; 713 qt., \$856.40; 714 qt., \$857.60; 715 qt., \$858.80; 716 qt., \$860.00; 717 qt., \$861.20; 718 qt., \$862.40; 719 qt., \$863.60; 720 qt., \$864.80; 721 qt., \$866.00; 722 qt., \$867.20; 723 qt., \$868.40; 724 qt., \$869.60; 725 qt., \$870.80; 726 qt., \$872.00; 727 qt., \$873.20; 728 qt., \$874.40; 729 qt., \$875.60; 730 qt., \$876.80; 731 qt., \$878.00; 732 qt., \$879.20; 733 qt., \$880.40; 734 qt., \$881.60; 735 qt., \$882.80; 736 qt., \$884.00; 737 qt., \$885.20; 738 qt., \$886.40; 739 qt., \$887.60; 740 qt., \$888.80; 741 qt., \$890.00; 742 qt., \$891.20; 743 qt., \$892.40; 744 qt., \$893.60; 745 qt., \$894.80; 746 qt., \$896.00; 747 qt., \$897.20; 748 qt., \$898.40; 749 qt., \$899.60; 750 qt., \$900.80; 751 qt., \$902.00; 752 qt., \$903.20; 753 qt., \$904.40; 754 qt., \$905.60; 755 qt., \$906.80; 756 qt., \$908.00; 757 qt., \$909.20; 758 qt., \$910.40; 759 qt., \$911.60; 760 qt., \$912.80; 761 qt., \$914.00; 762 qt., \$915.20; 763 qt., \$916.40; 764 qt., \$917.60; 765 qt., \$918.80; 766 qt., \$920.00; 767 qt., \$921.20; 768 qt., \$922.40; 769 qt., \$923.60; 770 qt., \$924.80; 771 qt., \$926.00; 772 qt., \$927.20; 773 qt., \$928.40; 774 qt., \$929.60; 775 qt., \$930.80; 776 qt., \$932.00; 777 qt., \$933.20; 778 qt., \$934.40; 779 qt., \$935.60; 780 qt., \$936.80; 781 qt., \$938.00; 782 qt., \$939.20; 783 qt., \$940.40; 784 qt., \$941.60; 785 qt., \$942.80; 786 qt., \$944.00; 787 qt., \$945.20; 788 qt., \$946.40; 789 qt., \$947.60; 790 qt., \$948.80; 791 qt., \$950.00; 792 qt., \$951.20; 793 qt., \$952.40; 794 qt., \$953.60; 795 qt., \$954.80; 796 qt., \$956.00; 797 qt., \$957.20; 798 qt., \$958.40; 799 qt., \$959.60; 800 qt., \$960.80; 801 qt., \$962.00; 802 qt., \$963.20; 803 qt., \$964.40; 804 qt., \$965.60; 805 qt., \$966.80; 806 qt., \$968.00; 807 qt., \$969.20; 808 qt., \$970.40; 809 qt., \$971.60; 810 qt., \$972.80; 811 qt., \$974.00; 812 qt., \$975.20; 813 qt., \$976.40; 814 qt., \$977.60; 815 qt., \$978.80; 816 qt., \$980.00; 817 qt., \$981.20; 818 qt., \$982.40; 819 qt., \$983.60; 820 qt., \$984.80; 821 qt., \$986.00; 822 qt., \$987.20; 823 qt., \$988.40; 824 qt., \$989.60; 825 qt., \$990.80; 826 qt., \$992.00; 827 qt., \$993.20; 828 qt., \$994.40; 829 qt., \$995.60; 830 qt., \$996.80; 831 qt., \$998.00; 832 qt., \$999.20; 833 qt., \$1000.40; 834 qt., \$1001.60; 835 qt., \$1002.80; 836 qt., \$1004.00; 837 qt., \$1005.20; 838 qt., \$1006.40; 839 qt., \$1007.60; 840 qt., \$1008.80; 841 qt., \$1010.00; 842 qt., \$1011.20; 843 qt., \$1012.40; 844 qt., \$1013

Sieves and Sifters—

Hunter's Imitation, gro. \$11.00@11.50
 Buffalo Metallic Blue, S. S. & Co., per gr.:
 14 & 16 18x18 18x20
 12x90 \$13.90 \$13.80 \$15.00
 F. J. Meyers' Mfg. Co.:
 Electric Light, per gr. \$11.00
 Hunter's Genuine, per gr. \$12.50
 No Name, Hunter's, per gr. \$11.00
 Standard, per gr. \$11.00
 Shaker (Barber's Pat.) Flour Sifters,
 per doz. \$2.00

Sieves, Tin Rim—

Per dozen
 Mesh 14 16 18 20
 Black, full size, \$0.95 1.05 1.10 1.10
 Plated, full size, \$1.05 1.05 1.10 1.10
 Black, scant, \$0.75 0.80 0.85 0.85

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch
 Mesh 15, Nested, doz. \$0.55@0.75
 Mesh 20, Nested, doz. .75@.85
 Mesh 24, Nested, doz. .90@1.00

Sinks—Cast Iron—

Standard list, \$5.00@10.00
 Note.—There is not entire uniformity
 in use by jobbers.

Wrought Steel—

New Era, Galv'd and Enamelled, 70x55
 New Era, Painted, 50x105
 L. & G. Mfg. Co., Galvanized, 50x
 L. & G. Mfg. Co., Enamelled, 50x

Sinks, Wagon—

Cast Iron, 70x10@75x
 Malleable Iron, 40x10@50x

Slates—

Factory Shipments.
 "D" Slates, 50x10@10x10
 Unexcelled, etc., Noiseless Slates, 60
 & 8 tens 5

Wire Bound—

Web Hinge, 50x10@50x
 Wire Bound, 50x10@50x

Slaw Cutters—See Cutters.**Slicers, Vegetable—**

Sterling \$2.00, 33x14

Snaps, Harness—

German, 40x10@10x
 Covert Mfg. Co.:
 Derby, 35x25
 High Grade, 45x25
 Jockey, 45x25
 Trojan, 45x25
 Yankee, 35x25
 Yankee, Roller, 35x25

Covert's Saddlery Work—

Crown, 50x10@50x
 German, 50x10@50x
 Model, 50x10@50x
 Triumph, 50x10@50x

W. & E. T. Fitch Co.:—

Bristol, 40x10@40x
 Empire, 50x25
 German, 50x10@50x
 National, 50x25
 Perfect, 45x25
 Clipper, 50x25
 Champion, 40x25
 Security, 40x25

Onions' Community—

Solid Steel, 55x65@55x
 Solid Wire, 55x10@55x
 Margent's Patent Guard, 55x10@55x

Snaths—

Soythe, 50x10@50x
 Snips, Tinners'—See Shears.

Soldering Irons—

See Irons, Soldering.
 Spoke Trimmers—
 See Trimmers, Spoke.

Spoons and Forks—

Silver Plated—
 Good Quality, 50x10@50x
 Cheap, 40x10@40x

International Silver Co.:—

1847 Rogers Bros. and Rogers & Hamilton,
 Rogers & Bro., William Rogers Forks
 Brand, 50x10@50x
 Anchor, Rogers Brand, 50x10@50x
 Wm. Rogers & Son, 50x10@50x
 Simeon L. & Geo. H. Rogers Co.:
 Silver Plated Flat Ware, 50x10@50x
 No. 77 Silver Plated Ware, 50x10@50x

Miscellaneous—

German Silver, 50x10@50x
 Simeon L. & Geo. H. Rogers Co.:
 German or Nickel Silver, Special list
 1 & 10x

Tinned Iron—

Teas, per gro. 45x50
 Tables, per gro. 90x100

Springs—Door—

Gem (Coll), 20x
 Star (Coll), 30x
 Torrey's Rod, 50 in., per doz. \$1.10@1.25
 Victor (Coll), 50x10@50x

Carriage, Wagon, &c.

14 in. and Wider:
 Black or 1/2 Bright, lb. 4x4
 Bright, lb. 4x4
 Painted Seat Springs:
 14 x 22 and smaller, per pr. 4x50
 14 x 22 and smaller, per pr. 4x50
 14 x 22 and smaller, per pr. 4x50

Clin's Springs:

Booster, 40x
 Seat, per pair, 50x
 Pole, per pair, 1/4 in. \$1.10 1/2 in. \$1.25

Sprinklers, Lawn—

Enterprise Mfg. Co., 25x30x
 Philadelphia No. 1, per doz. \$1.10 No. 2,
 \$1.15 No. 3, \$1.20

Squares—

Nickel plated, List Jan. 5, 1909
 Steel and Iron, 7x10@7x10
 Rosewood Hdl Try Square and T-
 Bevels, 60x10@60x10

Iron Hdl. Try Squares and T-Bevels.

Wt 10@10x10x10
 Diston's Try Sq. and T-Bevels, 60x10
 Winterbottom's Try and Miter, 60x10

Squeezers—

Lemon—
 Wood, Common, gro. No. 9, \$5.55
 \$5.50; No. 1, \$6.85@6.50.
 Wood, Porcelain Lined:
 Cheap, doz. \$2.00@2.25
 Good Grade, doz. \$3.00@3.50
 Tinned Iron, doz. \$0.75@1.25
 Iron, Porcelain Lined doz. \$2.00@2.50
 Jennings' Star, per doz. \$1.55@1.90

Staples—

Barbed Blind, lb. 60x40
 Electricians', Association list, 30x10
 Fence Staples, same price as Barbed
 Wire. See Trade Report.
 Poultry Netting, Staples, per lb. 54x40
 Grand Crossing Pack Co.'s list, 30x10x

Steels, Butchers'—

Dick's, 30x
 Foster Bros., 30x
 Hartzell Cutlery Co., 30x
 C. & A. Hoffmann's, 40x

Steelyards—

25x25x105

Stocks and Dies—

Blacksmiths', 10x10x10
 Gardner Die Stocks No. 1, 50x
 Gardner Die Stocks, larger sizes, 40x
 Green River, 25x
 Lightning Screw Plate, 25x
 Little Giant, 25x
 Reece's New Screw Plates, 35x30x
 Curtis Reversible Ratchet Die Stock, 25x

Stone—

Soythe Stones—
 Chicago Wheel & Mfg. Co.:
 Gem Corundum, 1/2 inch, \$3.00 per
 gro. 12 inch, \$10.00
 Pike Mfg. Co. 1901 list:
 Black Diamond S. S., per gro. \$12.00
 Lamolite S. S., per gro. \$11.00
 White Mountain S. S., per gro. \$9.00
 Green Mountain S. S., per gro. \$6.00
 Extra Indian Pond S. S., per gro. \$7.50
 No. 1 Indian Pond S. S., per gro. \$7.00
 No. 2 Indian Pond S. S., per gro. \$4.50
 Leader Red End S. S., per gro. \$4.50
 Balance of 1901 list \$3.50

Oil Stones, &c.

Chicago Wheel & Mfg. Co., 1901 list:
 Gem Corundum Oil, Double Grit, 30x
 Gem Corundum Oil, Single or Double
 Grit, 35x
 Gem Corundum Oil, 35x
 Gem Corundum Razor Hones, 50x

Pike Mfg. Co. 1901 list:

Arkansas Stone, No. 1, 3 to 5 in. \$2.50
 Arkansas Stone, No. 1, 5 to 8 in. \$3.50
 Arkansas Stone, No. 1, 8 to 10 in. \$4.50
 Lily White Washita, 4 to 8 in. 60x
 Rosy Red Washita, 4 to 8 in. 60x
 Washita Stone, Extra, 4 to 8 in. 50x
 Washita Stone, No. 1, 4 to 8 in. 40x
 Washita Stone, No. 2, 4 to 8 in. 30x
 Lily White Slips, 4 to 8 in. 30x
 Rosy Red Slips, 4 to 8 in. 30x
 Washita Slips, Extra, 4 to 8 in. 30x
 Washita Slips, No. 1, 4 to 8 in. 70x

India Oil Stones (entire list)

Hindustan No. 1, Regular, 30x
 Hindustan No. 1, Small, 30x
 Aze Stones (all kinds), 30x
 Turkey Oil Stones, ex. 5 to 8 in. 50x
 Queer Creek Slips, 4 to 8 in. 30x
 Sand Stone, German and Swazey Razor
 Hones, 40x
 Natural Grit Carving Knife Hones, 40x
 Quick Edge Pocket Knife Hones, 30x
 Mounted Kitchen Sand Stone, 30x
 do. 30x

Tanite Mills:

Emery Oil, per doz. \$5.00, 50x60x

Stoners—**Cherry—**

Enterprise, 25x30x

Stops, Bench—

Morris's, 15x10x
 Morris's, 1/2 doz. No. 1, \$1.00, 30x
 Morris's, No. 2, \$1.25, 30x

Stops, Window—

Ives' Patent, 25x55x

Stove Boards—

See Boards, Stove.

Stove Polish—See Polish, Stove.**Strainers, Pump—**

Diamond Joe Pump Strainers, per doz. 75x

Straps, Box—

Cary's Universal case lots, 30x10x

Stretchers, Carpet—

Cast Iron, Steel Points, doz. 55x65x

Strops, Razor—

Smith & Hemenway Co., 70x

Stuffers, Sausage—

Enterprise Mfg. Co., 25x25x7x
 National Specialty Mfg. Co., list Jan.
 1, '97, 30x

Tacks Brads, &c.—

List Jan. 15, '99.
 Carpet Tacks, American 30x25x
 American Cut Tacks, 30x20x
 Suedes Iron Tacks, 30x20x
 Suedes Upholsterers' Tacks, 30x20x
 Gimp Tacks, 30x20x
 Lace Tacks, 30x20x
 Trimmers' Tacks, 30x25x
 Looking Glass Tacks, 70x10x
 Bill Posters' and Railroad Tacks, 30x10x
 Hungarian Nails, 30x10x
 Common and Patent Brads, 30x10x
 Trunk and Clout Nails, 30x10x

NOTE.—The above prices are for
 straight weights. An extra 5% is given
 for Star Weights and an extra 10% on
 Standard Weights.

Miscellaneous—

Double Point Tacks, 30x25 or 7 tens
 Steel Wire Brads, R. & E. Mfg.
 Co.'s list, 50x10@50x
 See also Nails, Wire.

Tanks, Oil—

Emerald, S. S. & Co., 30-gal. \$3.30
 Emerald, S. S. & Co., 60-gal. \$4.00
 Queen City S. S. & Co., 0-gal. \$3.50
 Queen City S. S. & Co., 60-gal. \$4.35

Tapes, Measuring—

American Asses' Skin, 40x10@50x
 Patent Leather, 40x10@50x
 Steel, 40x10@50x
 Cheaterman's, 40x10@50x
 Eddy's Steel, 40x10@50x
 Eddy's Metallic, 40x10@50x
 Keuffel & Esser Co., Steel and Metallic,
 Lower list, 1899, 35x
 Lufkin's Steel, 39x35x
 Lufkin's Metallic, 39x35x

Teeth Harrow—

Steel Harrow Teeth, plain or head-
 ed, bar per lb. 25x40

Thermometers—

Tin Case, 30x10@30x10x55x

Ties, Bale—Steel.

Standard Wire, 30x10x55x

Ties, Wall—

Cleveland Wire Spring Co.:
 Galv. Steel 5-32 x 6 1/2 in. \$1.00, \$1.00
 Galv. Steel 5-32 x 8 1/2 in. \$1.00, \$1.10
 Galv. Steel 5-32 x 11 1/4 in. \$1.00, \$1.20
 Galv. Steel 5-32 x 15 1/4 in. \$1.00, \$1.40

Tinners' Shears, &c.—

See Shears, Tinners', &c.

Tinware—

Stamped, Japanned and Plead, sold
 very generally at net prices.

Tire Benders, Upsetters,

&c.—See Benders and Upset-
 ters, Tire.

Tobacco Cutters—

See Cutters, Tobacco.

Tools—Coopers'—

L. & J. J. White, 30x20x55x
 Saw—
 Atkins' Cross Cut Saw Tools, 40x
 Simonds' Improved, 35x45
 Simonds' Crosscut, 35x

Ship—

L. & J. J. White, 25x

Transom Lifters—

See Lifters, Transom.

Traps—Fly—

Balloon, Globe or Acme,
 doz. \$1.15@1.25; gro. \$10.50@11.00
 Harper, Champion or Paragon,
 doz. \$1.25@1.40; gro. \$12.00@12.50

Game—

Oneida Pattern, 75x10x55x80x55x
 Newhouse, 45x45x55x
 Hawley & Norton, 55x55x55x10x
 Victor (Oneida Pattern), 75x75x55x
 Star (Blake Pattern), 60x55x60x10x

Mouse and Rat—

Mouse, Wood, Choker, doz. holes,
 8 1/2x9c

Mouse, Round or Square Wire—

doz. \$0.85@1.00

American Pattern French Rat and Mouse

Traps—
 No. 1, Detroit Marty Pattern, per doz.
 \$4.50; in 1/2 gro. lots, per doz. \$4.00
 No. 2, Detroit Marty Pattern, per doz.
 \$4.25; in 1/2 gro. lots, per doz. \$4.00
 Detroit Marty Pattern Mouse, per doz.
 \$2.00; in 1/2 gro. lots, per doz. \$1.75
 Diamond Joe Mouse Traps, per doz. 60x
 Diamond Joe Rat Traps, per doz. 10x
 Marty French Rat and Mouse Traps
 (Genuine):
 No. 1, Rat, Each \$1.12 1/2; per doz. \$12.00
 No. 3, Rat, per doz. \$6.00; case of 50
 \$5.35 doz.
 No. 3 1/2, Rat, per doz. \$4.75; case of 75
 \$4.25 doz.
 No. 4, Mouse, per doz. \$3.50; case of 75
 \$2.75 doz.
 No. 5, Mouse, per doz. \$2.75; case of 150
 \$2.25 doz.
 Schuyler's Rat Killer, No. 1, per gr. \$30.00;
 No. 2, per gr. \$30.00; Mouse, No. 3,
 \$18.00

Target—

Markle's, each, \$5.50

Trimmers, Spoke—

Bonney's Nos. 1 and 2, 40x

Trowels—

Diston Brick and Pointing, 30x
 Diston Plastering, 25x
 Diston "Standard Brand" and Ga-
 den Trowels, 40x
 Never-Break Steel Garden Trowels,
 gro. \$7.00
 Peace's Plastering, 30x
 Rose Brick and Plastering, 25x
 Woodrough & McParlin, Plastering, 25x

Trucks, Warehouse, &c.—

R. & L. Block Co.'s list, 50x
 Day Star Trucks, Improved pattern
 Steel, 50x
 Model Stove Trucks, per doz. \$15.50

Tubs, Wash—

No. 1 2 3
 Galvanized, per doz. \$5.00 5.50 6.00
 Galvanized Wash Tubs (S. S. & Co.):
 No. 1 2 3 10 20 30
 per doz. \$5.25 6.00 6.75 6.50 7.25 8.00

Twine—**Miscellaneous—**

Flax Twine—
 No. 9, 1/4 and 1/2-lb. Balls, 24c 24c
 No. 12, 1/4 and 1/2-lb. balls, 18c 20c
 No. 24, 1/4 and 1/2-lb. Balls, 16c 18c
 No. 48, 1/4 and 1/2-lb. Balls, 15c 17c
 No. 56, 1/4 and 1/2-lb. Balls, 15c 17c

Chalk Line, Cotton, 1/4-lb. Balls.

25x40

Cotton Mops, 2, 9, 12 and 15 lb. to

doz., 75x
 Cotton Wrapping, 5 Balls to lb.
 according to quality, 10x40x75x
 American 3-Ply Hemp, 1/4 and 1/2-lb.
 Balls, 15x10x
 American 3-Ply Hemp, 1-lb. Balls, 15x10x

India 2-Ply Hemp, 1/4 and 1/2-lb.

Balls (Spring Twine), 25x
 India 3-Ply Hemp, 1-lb. Balls, 25x
 India 3-Ply Hemp, 1 1/2-lb. Balls, 25x
 2, 3, 4 and 5-Ply Jute, 1/4-lb. Balls, 25x

Mason Line, Linen, 1/4-lb. Balls, 25x

No. 26, Mattress, 1/4 and 1/2-lb. Balls, 25x
 Wool, 5 to 6 ply, 25x

Vises—

Solid Box, 50x60x10x

Parallel—

Atthol Machine Co.:
 Simpson's Adjustable, 40x
 Standard, 40x
 Amateur, 25x
 Bonney's, 40x
 Columbian Hdw. Co., 40x
 Fisher & Norris Double Screw, 15x10x
 Hollands', 40x
 Machinists', 40x
 Keystone, 60x55x
 Lewis Tool Co., 30x30x
 Massey's Perfect, 15x20x
 Massey's, 15x20x
 Glitcher, 30x40x
 Combination, Quick Adj., 40x
 Woodworker's, 15x20x
 Merrill's, 30x
 Miller's Falls, 50x10x10x

Parker's:

Victor, 20x25x
 Regular, 20x25x
 Vulcan's, 40x40x
 Combination Pipe, 55x60x
 Prentiss, 30x20x
 Sargent's, 40x
 Sneliker's X. L., 30x25x
 Stephens', 20x25x

Saw Filers—

Bonney's No. 1, \$13; No. 3, \$16, 50x
 Diston's D S Clamp and Guide, per doz.
 \$30, 25x
 Reading, 60x
 Wentworth's Rubber Jaw, Nos. 1,
 2 and 3, 45x50x

Miscellaneous—

Bignall & Keeler Combination Pipe
 150, 60x
 Parker's Combination Pipe:
 87 Series

Brass Surface:
brass King, Single Surface, open
back.....\$3.00
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface.....\$3.00

Washers—
Leather, Axle—
Solid.....85¢10¢10¢85¢10¢10¢10¢
Patent.....85¢10¢10¢85¢20¢
Coil: 1/2 1 1 1/2 1 3/4 1 1/2 Inch.
100 11c 1 1/2 13c per 100

Iron or Steel
Size bolt.....5-16 3/4 1/2 3/4 1/2 3/4
Washers.....\$5.10 4.30 3.50 2.70 2.50
In lots less than one keg add 1/4c per
lb., 5-lb. boxes add 1/2c to list.

Cast Washers—
Over 1/2 inch, barrel lots, per lb.....1 1/2¢1 3/4¢

Washer Cutters—
See Cutters, Washer.

Washing Machines—
See Machines, Washing.

Water Coolers—
See Coolers, Water.

Wedges—
Oil Finish.....lb. \$2.90@3.10c

Weights, Sash—
Per ton, f.o.b. factory.....\$1.00@2.00

Some Foundries make price \$1@1 1/2¢
lower.

Well Buckets, Galvanized
See Pails, Galvanized.

Wheels Well—
8-in. \$1.45@1.65; 10-in., \$1.75@2.00;
12-in., \$2.35@2.50; 14-in., \$3.50@3.75

Wire and Wire Goods—
Bright and Annealed:
6 to 9.....7 1/2¢@7 3/4¢10¢
10 to 18.....7 1/2¢@10¢1 1/4¢10¢5¢
19 to 36.....7 1/2¢@10¢1 1/4¢10¢5¢
27 to 36.....7 1/2¢@10¢1 1/4¢10¢5¢

Galvanized:
6 to 18.....70¢@70¢5¢
19 to 36.....7 1/2¢@7 3/4¢10¢5¢
27 to 36.....7 1/2¢@10¢1 1/4¢10¢5¢

Coppered:
6 to 9.....70¢@70¢10¢
10 to 18.....70¢@70¢10¢5¢
19 to 36.....7 1/2¢@7 3/4¢10¢5¢
27 to 36.....7 1/2¢@10¢1 1/4¢10¢5¢

Tinned:
6 to 18.....75¢@75¢1 1/4¢
15 to 18.....7 1/2¢@7 3/4¢10¢
19 to 36.....70¢@70¢5¢
27 to 36.....70¢@70¢5¢

Annealed Wire on Spools—70¢@70¢
10¢

Brass and Copper Wire on Spools—
60¢@50¢10¢
Brass, list Feb. 26, '96.....85¢
Copper, list Feb. 26, '96.....15¢
Cast Steel Wire.....50¢
Stubs' Steel Wire.....\$6.00 to \$2.40¢
Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—
List April 1, 1901.....85¢10¢
Wire Cloth and Netting—
Galvanized Wire Netting, 30¢@20¢. 1
Painted Screen Cloth per 100 ft.....\$1.00

Light Hardware Grade:
2-14 Mesh, Plain (Sc. list) sq. ft.....1 1/4¢1 3/4¢
2-18 Mesh, Galv. (Sc. list) sq. ft.....1 1/4¢1 3/4¢

Wire, Barb—See Trade Report.
Wire Rope—See Rope, Wire.
Wrenches—
Agricultural.....70¢10¢75¢5¢
Case lots.....75¢10¢
Acme.....80¢10¢
Alligator.....70¢
Baxter's S.....80¢10¢
Bull Dog.....70¢
Bentley & Co's.....35¢5¢
Adjustable S Pipe.....40¢
Riggs' Pattern.....30¢10¢
Combination Black.....40¢5¢

Combination Bright.....40¢
Cylinder or Gas Pipe.....55¢
Extra Heavy.....45¢
Merrick's Pattern.....50¢
No. 3 Pipe, Bright.....55¢
Bindley Automatic.....30¢10¢
Boardman's.....35¢4¢
Coe's Genuine.....40¢10¢5¢5¢
Coe's "Mechanics".....40¢10¢5¢5¢
Donohue's Engineer.....40¢10¢
Eagle.....30¢10¢
Elgin Wrenches.....40¢
Elgin Monkey Wrench Pipe Jaws.....35¢4¢
Gem Pocket.....30¢
Hercules.....70¢
Knife Hand e, Machinists' (W. & B.)
Case lots.....50¢10¢
Less than case lots.....50¢5¢
Improved Pipe (W. & B.).....10¢
Solid Handle, P. S. & W.....50¢50¢10¢
Sills.....60¢10¢
Triumph.....60¢10¢

Wrought Goods
Staples, Hooks, etc., list March 17,
'92.....70¢9¢10¢
Yokes Neck—
Covert Sattler Works, Trimmed 100&35
Covert Saddler Works, Neck Yoke
Centers.....70¢
Yokes, Ox, and Ox Bows—
Fort Madison's Farmers & Freighters'.....list net

Zinc—
Sheet.....lb 6¢ c@1 1/4¢

PAINTS, OILS AND COLORS—Wholesale Prices.

White Lead, Zinc, &c.
Lead, English white, in Oil.....75¢ 9 1/2¢
Lead, American White, in Oil:
Lots of 500 lb or over.....6¢ 6 1/2¢
Lots less than 500 lb.....6 1/2¢
Lead, White, in oil, 25 lb tin
pails, add to keg price.....1 1/2¢
Lead, White, in oil, 13 1/2 lb tin
pails, add to keg price.....1 1/2¢
Lead, White, in oil, 1 to 5 lb as-
sorted tins, add to keg price.....1 1/2¢
Lead, White, Dry in bbls.....5 1/2¢ 6
Lead, American, Terms: On lots of 500
lbs, and over, 60 days, or 25 for cash if
paid in 15 days from date of invoice.
Zinc, American, dry.....43¢ 47¢
Zinc, Paris, Red Seal, dry.....88¢
Zinc, Paris, Green Seal, dry.....92¢
Zinc, Antwerp, Red Seal, dry.....94¢
Zinc, Antwerp, Green Seal, dry.....94¢
Inc. V. M. French, in Poppy Oil,
Green Seal:
Lots of 1 ton and over.....12¢ 12 1/2¢
Lots less than 1 ton.....12 1/2¢ 13 1/2¢
Zinc, V. M. French, in Poppy Oil,
Red Seal:
Lots of 1 ton and over.....10 1/2¢ 11 1/4¢
Lots less than 1 ton.....11¢ 11 1/2¢
Discounts.—V. M. French Zinc.—Dis-
counts to buyers of 10 bbl, lots of one or
assorted grades, 15; 25 bbls. 5¢; 50
bbls. 45.

Dry Colors.
Black, Carbon.....5¢ 5 1/2¢
Black, Drop, Amer.....4¢ 7
Black, Drop, Eng.....7¢ 11
Black, Ivory.....12¢ 31
Lamp, Com.....45¢ 6
Blue, Celestial.....30¢ 35
Blue, Chinese.....30¢ 35
Blue, Prussian.....28¢ 34
Blue, Ultramarine.....4¢ 30
Brown, Spanish.....4¢ 1
Brown, Vandyke, Amer.....13¢ 2 1/2¢
Brown, Vandyke, Foreign.....24¢ 3 1/2¢
Carmine, No. 40.....\$2.05@2.75
Green, Chrome, ordinary.....5¢ 6 1/2¢

Green, Chrome, pure.....10¢ 20
Lead, Red, bbls. 5 bbls. and kegs:
Lots 500 lb or over.....5 1/2¢
Lots less than 500 lb.....6¢
Litharge, bbls. 4 bbls. and kegs:
Lots 500 lb or over.....5 1/2¢
Lots less than 500 lb.....6¢
Ocher, French Washed.....13¢ 1 1/2¢
Ocher, Dutch Washed.....43¢ 5
Ocher, American.....\$10.00@15.00
Orange Mineral, English.....8¢ 10
Orange Mineral, French.....10¢ 10 1/2¢
Orange Mineral, German.....8¢ 10
Orange Mineral, American.....7 1/2¢ 8 1/2¢
Red, Indian, English.....45¢ 8 1/2¢
Red, Indian, American.....3¢ 3 1/2¢
Red, Turkey, English.....4¢ 6
Red, Tuscan, English.....7¢ 10
Red, Venetian, Amer.....\$100 80¢ 1.75
Red Venetian, English.....\$100 1.30@3.00
Sienna, Italian, Burnt and
Powdered.....3 1/2¢ 7 1/2¢
Sienna, Ital. Raw Powder.....3 1/2¢ 7 1/2¢
Sienna, American, Raw.....1 1/2¢ 3
Sienna, American, Burnt and
Powdered.....1 1/2¢ 3
Talc, French.....\$100 \$1.25@1.50
Talc, American......90¢ 1.10
Terra Alba, French.....\$100 \$1.00
Terra Alba, English......95¢ 1.00
Terra Alba, American No. 1......85¢ .95
Terra Alba, American No. 2......45¢ .55
Umber, Turkey, Bnt. & Powd.....2 1/2¢ 3 1/2¢
Umber, Turkey, Raw & Powd.....2 1/2¢ 3 1/2¢
Umber, Bnt. Amer.....1 1/2¢ 2
Umber, Raw, Amer.....1 1/2¢ 2
Yellow, Chrome.....10 1/2¢ 25
Vermilion, American Lead.....10¢ 40
Vermilion, Quicksilver, bulk......60¢
Vermilion, Quicksilver, bags......67¢
Vermilion, English, Import......80¢ .95
Vermilion Chinese.....\$1.05@1.30

Colors in Oil.
Black, Lampblack.....12¢ 14
Blue, Chinese.....36¢ 40
Blue, Prussian.....32¢ 38
Blue, Ultramarine.....13¢ 16

Brown, Vandyke.....9 1/2¢ 13
Green, Chrome.....10¢ 12
Green, Paris......92¢
Sienna, Raw......10¢ 13
Sienna, Burnt......10¢ 13
Umber, Burnt......9 1/2¢ 13

Miscellaneous.
Barytes, Foreign, 50 ton.....\$19.00@31.00
Barytes, Amer. floated.....19.00@30.00
Barytes, Crude, No. 1.....8.00@10.00
Chalk, in bulk.....\$50 2.50@2.80
Chalk, in bbls.....\$100 3.50
China Clay, English.....\$100 13.00@17.50
Cobalt, Oxide.....\$100 3.90@5.50
Whiting, Common.....\$100 4.00
Whiting, Gliders......45¢ .65
Whiting, extra Gliders......55¢ .75

Putty.
In bladders.....\$2.45
In bulk.....1.25
In cans 1 lb to 5 lb.....3.25
In cans 12 lb to 25 lb.....3.35

Spirits Turpentine.
In Southern bbls.....44¢ 45¢
In machine bbls.....45¢ 45 1/2¢

Glue.
Cabinet.....1 1/4¢ 1 1/2¢
Extra White.....13¢ 24
French.....12¢ 40
Irish.....13 1/2¢ 18
Low Grade.....9¢ 12
Medium White.....14¢ 16 1/2¢

**Animal, Fish and Vege-
table Oils.**
Linseed, City, raw.....\$ gal. 60¢ 62

Linseed, City, boiled.....62¢ 65 1/2¢
Linseed, State and West'n, raw, No. 1.....61¢
Linseed, raw Calcutta see 1.....65¢
Lard, Prime.....78¢ 79
Lard, Extra No. 1.....83¢ 80
Lard, No. 1.....49¢ 50
Cotton-seed, Crude......60¢
Cotton-seed, Summer Yellow,
prime.....43¢ 44
Cotton-seed Summer Yellow,
off grades.....41¢ 42
Sperm, Crude......71¢ 72
Sperm, Natural Spring.....71¢ 73
Sperm, Bleached Spring.....74¢ 76
Sperm, Natural Winter.....75¢ 77
Sperm, Bleached Winter.....78¢ 80
Tallow, Prime.....60¢ 65
Whale, Crude......46¢
Whale, Natural Winter.....46¢ 47
Whale, Bleached Winter.....48¢ 49
Menhaden, Crude, Sound......40¢
Menhaden, Light Strained.....32¢ 33
Menhaden, Bleached Winter.....34¢ 35
Menhaden, Ex Bleached Winter.....37¢
Cocoanut, Ceylon......8¢
Cocoanut, Cochin......8¢ 9
Cod, Domestic.....39¢ 39 1/2¢
Cod, Newfoundland.....35¢ 40
Red Flare......12¢
Red Saponified.....\$ 3 69¢ 80¢
Olive, Italian, bbls.....57¢ 60¢
Neatsfoot, prime.....57¢ 58¢
Palm, prime, Lagos.....\$ 5 53¢ 6

Mineral Oils.
Black, 20 gravity, 25@30 cold
test.....\$ gal. 9 1/2¢ 10 1/4¢
Black, 20 gravity, 15 cold test, 10¢@11¢
Black, summer.....9 1/2¢ 9 1/2¢
Cylinder, light filtered.....14¢ 15 1/2¢
Cylinder, dark filtered.....11 1/4¢ 15 1/2¢
Paraffine, 903-907 gravity.....12¢ 13 1/2¢
Paraffine, 903 gravity.....11 1/4¢ 15 1/2¢
Paraffine, 883 gravity.....9¢ 11 1/4¢
Paraffine, red, No. 1.....12¢ 13 1/2¢
In small lots 1¢ advance.

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